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TM 11-5820-786-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATOR'S, ORGANIZATIONAL, DS, GS  
AND DEPOT MAINTENANCE MANUAL

OSCILLATOR-COUPLER

O-1562 FCC



HEADQUARTERS, DEPARTMENT OF THE ARMY

FEBRUARY 1970  
4813

### **WARNING**

SERIOUS INJURY may result from accidental contact with 115 to 220 volts ac line connections, which are present on terminals TB 3-1 and TB 3-2 of the equipment. Be careful when working at rear of or inside the equipment.

**DO NOT TAKE CHANCES!**



Change }  
No. 2 }

CENTRAL FILES

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
Washington, DC, 16 October 1973

**Operator's, Organizational, Direct Support,  
General Support, and Depot Maintenance Manual  
Including Repair Parts and Special Tool Lists  
OSCILLATOR-COUPLER 0-1562/FCC**

TM 11-5820-786-15, 26 February 1970, is changed as follows:

1. A vertical bar appears opposite changed material.
2. Remove and insert pages as indicated in the page list below:

Remove pages	Insert pages
i .....	i .....
1-1 and 1-2 .....	1-1 and 1-2
B-1 and B-2 .....	None

3. File this change sheet in front of the manual for reference purposes.

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11-97  
11-98  
11-117  
11-127  
11-158  
11-302  
11-500(AA-AC)

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 310-50.

RESEARCH  
INSTITUTE OF THE ARMY  
WASHINGTON, D.C. 20315

# General Report and Special Studies Including Special Reports and Special Studies

The following is a summary of the work done during the year.

1. A series of experiments were conducted to determine the effect of various factors on the rate of reaction.

2. The effect of temperature on the rate of reaction was studied. It was found that the rate of reaction increased with increasing temperature.

3. The effect of concentration on the rate of reaction was studied. It was found that the rate of reaction increased with increasing concentration.

4. The effect of catalyst on the rate of reaction was studied. It was found that the rate of reaction increased with increasing catalyst.

Factor	Rate of Reaction
Temperature	Increased
Concentration	Increased
Catalyst	Increased
Pressure	Increased
Volume	Decreased
Surface Area	Increased
Time	Increased
Distance	Increased
Mass	Increased
Volume	Decreased
Temperature	Increased
Concentration	Increased
Catalyst	Increased
Pressure	Increased
Volume	Decreased
Surface Area	Increased
Time	Increased
Distance	Increased
Mass	Increased
Volume	Decreased

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**Operator's, Organizational, DS, GS, and Depot Maintenance Manual**

**Including Repair Parts and Special Tool Lists**

**OSCILLATOR-COUPLER 0-1562/FCC**

TM 11-5820-786-15, 26 February 1970, is changed as follows:

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USAINTS (3)	11-500 (AA-AC)
USASCS (75)	
USAESC (20)	

NG: None

USAR: None

For explanation of abbreviations used, see AR 310-50

Technical Manual }  
 No. 11-5820-786-15 }

HEADQUARTERS  
 DEPARTMENT OF THE ARMY  
 Washington, D.C., 26 February 1970

**Operator's, Organizational, Direct Support,  
 General Support, And Depot Maintenance Manual**

**OSCILLATOR-COUPLER O-1562/FCC**

	Paragraph	Page
Chapter 1. INTRODUCTION		
Section I. General	1-1—1-3.1	1-1
II. Description and data	1-4—1-7	1-1
Chapter 2. INSTALLATION	2-1—2-7	2-1
3. OPERATION	3-1, 3-2	3-1
4. MAINTENANCE INSTRUCTIONS		
Section I. General requirements	4-1, 4-2	4-1
II. Preventive maintenance	4-3—4-6	4-1
III. Organizational maintenance	4-7—4-10	4-2
Chapter 5. SHIPMENT AND LIMITED STORAGE AND DEMOLITION OF MATERIEL TO PREVENT ENEMY USE		
Section I. Shipment and limited storage	5-1, 5-2	5-1
II. Demolition of materiel to prevent enemy use	5-3, 5-4	5-1
Chapter 6. FUNCTIONING OF EQUIPMENT	6-1, 6-2	6-1
7. DIRECT SUPPORT MAINTENANCE		
Section I. General	7-1, 7-2	7-1
II. Direct support troubleshooting	7-3, 7-4	7-1
III. Adjustment, removal, and replacement	7-5—7-8	7-2
IV. Direct support test procedures	7-9—7-17	7-3
Chapter 8. DEPOT MAINTENANCE	8-1—8-5	8-1
Appendix A. REFERENCES		A-1
B. BASIC ISSUE ITEMS LIST (BIL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITAL) (Not Applicable)		
C. MAINTENANCE ALLOCATION		C-1
Index		Index-1

DEPARTMENT OF THE ARMY  
WASHINGTON, D. C. 20315

OSCILLATOR COUPLED TO A  
GENERAL PURPOSE AND DEPENDENT MECHANICAL SYSTEM

1	INTRODUCTION
2	GENERAL
3	DEVELOPMENT OF THE MODEL
4	ANALYSIS OF THE MODEL
5	RESULTS
6	CONCLUSIONS
7	REFERENCES
8	APPENDIX A
9	APPENDIX B
10	APPENDIX C
11	APPENDIX D
12	APPENDIX E
13	APPENDIX F
14	APPENDIX G
15	APPENDIX H
16	APPENDIX I
17	APPENDIX J
18	APPENDIX K
19	APPENDIX L
20	APPENDIX M
21	APPENDIX N
22	APPENDIX O
23	APPENDIX P
24	APPENDIX Q
25	APPENDIX R
26	APPENDIX S
27	APPENDIX T
28	APPENDIX U
29	APPENDIX V
30	APPENDIX W
31	APPENDIX X
32	APPENDIX Y
33	APPENDIX Z



## LIST OF ILLUSTRATIONS

<i>Figure No.</i>	<i>Identification No.</i>	<i>Title</i>
1-1	EL 5820-786-15-TM-1	Oscillator-Coupler 0-1562/FCC.
1-2	EL 5820-786-15-TM-2	Typical application of Oscillator-Coupler 0-1562/FCC.
1-3	EL 5820-786-15-TM-3	Oscillator-Coupler 0-1562/FCC, top view (cover removed).
1-4	EL 5820-786-15-TM-4	Oscillator-Coupler 0-1562/FCC, bottom view (cover removed).
2-1	EL 5820-786-15-TM-5	Packaging data for Oscillator-Coupler 0-1562/FCC.
6-1	EL 5820-786-15-TM-14	Oscillator-Coupler 0-1562/FCC, block diagram.
7-1	EL 5820-786-15-TM-6	Output level and frequency test setup.
7-2	EL 5820-786-15-TM-7	Changeover system test setup.
7-3	EL 5820-786-15-TM-8	Output impedance test setup.
7-4	EL 5820-786-15-TM-9	Longitudinal unbalance test setup.
7-5	EL 5820-786-15-TM-10	Input power variation test setup.
7-6	EL 5820-786-15-TM-11	Frequency accuracy and stability test setup.
8-1	ESC-FM-4113-69	Color code marking for MIL-STD resistors, capacitors, and inductors.

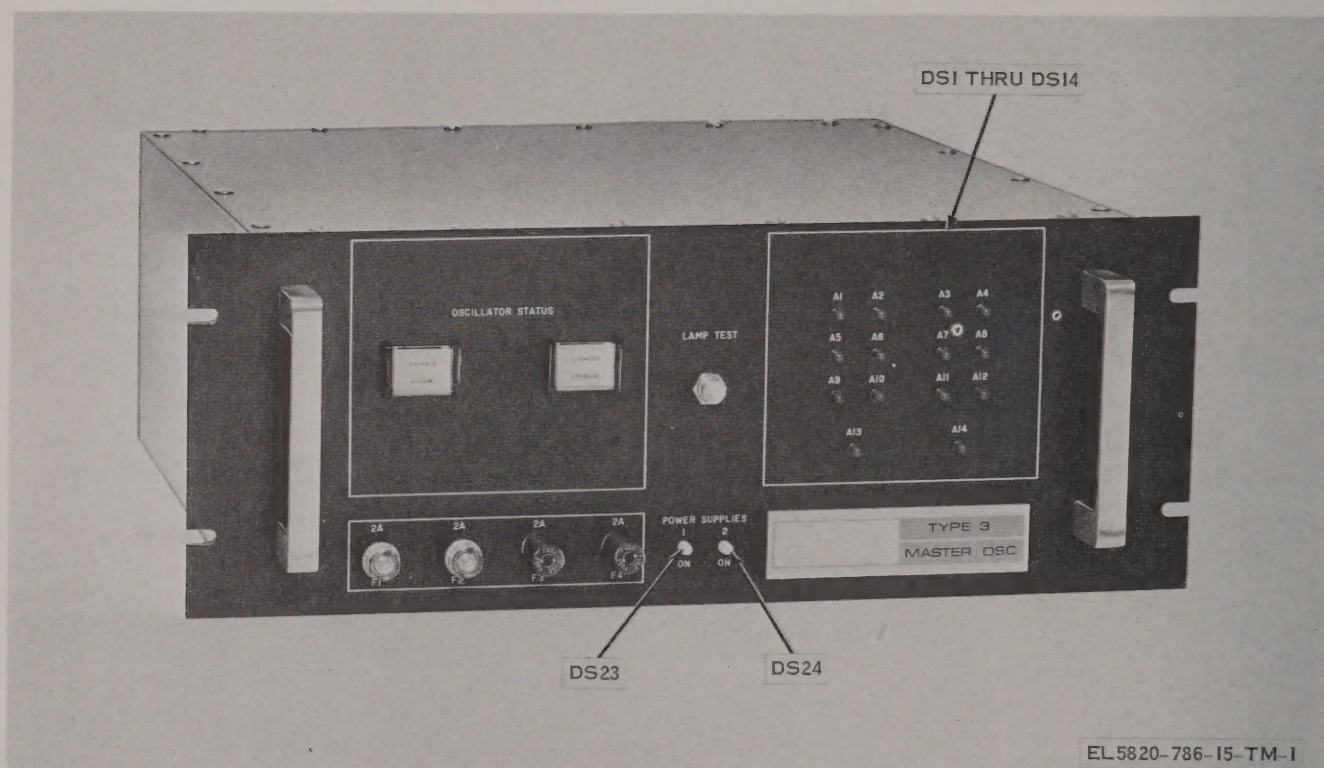


Figure 1-1. Oscillator-Coupler O-1562/FCC.



# CHAPTER 1 INTRODUCTION

## Section I. GENERAL

### 1-1. Scope

a. This manual contains information for installation, operation, and maintenance (operator's, organizational, direct support (DS), and depot maintenance of Oscillator-Coupler O-1562/FCC (oscillator-coupler) (fig. 1-1). Detailed functions of the equipment are covered in the function chapter.

b. The maintenance allocation chart (MAC) for Oscillator-Coupler O-1562/FCC appears in appendix C.

#### NOTE

Appendix C is current as of 19 January 1970.

### 1-2. Indexes of Publications

a. *DA Pam 310-4*. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. *DA Pam 310-7*. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

### 1-3. Forms and Records

a. *Reports of Maintenance and Unsatisfactory Equipment*. Maintenance forms, records, and re-

ports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. *Report of Packaging and Handling Deficiencies*. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/and MCO P4030.29 (Marine Corps).

c. *Discrepancy in Shipment Report (DISREP) (SF 361)*. Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army)/NAVSUP PUB 459 (Navy)/AFM 75-34 (Air Force)/and MCO P4610.19 (Marine Corps).

#### 1-3.1. Reporting of Equipment Publication Improvements

The reporting of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-C, Fort Monmouth, NJ 07703.

## Section II. DESCRIPTION AND DATA

### 1-4. Purpose and Use

a. Oscillator-Coupler O-1562/FCC provides a series of highly stable and frequency coherent signals for use as frequency standards in the generation of channel, group, and supergroup carriers in large voice-multiplex networks. A typical application is shown in figure 1-2. The oscillator-coupler 4-, 8-, and 128-kilocycle (kc) outputs can be used directly for carrier generation in conjunction with appropriate external harmonic generation equipment and the 60- and 96-kc selected outputs are used as frequency synchronization pilot signals for control master and slave oscillators in

local and/or remote stations of a network. Where required, the pilot signals may be converted to carrier signals through the use of frequency division and harmonic generation circuits.

b. The oscillator-coupler provides outputs of 4, 8, 60, 96, and 128 kc and contains a provision for the addition of a frequency to be determined by the user. All frequency generation and division equipment contained in the oscillator-coupler is duplexed. An automatic changeover system switches on line operation from one oscillator system to the alternate oscillator system when an output level drops 2 decibels (db) from the nominal output of  $-10 \pm 0.5$  (dbm).

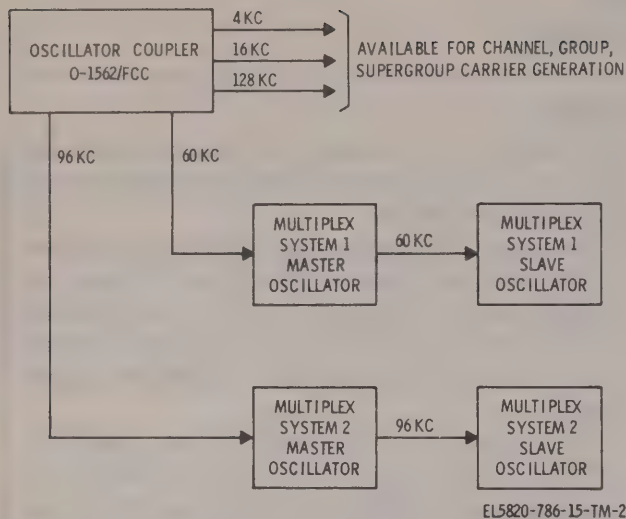


Figure 1-2. Typical application of Oscillator-Coupler O-1562/FCC.

## 1-5. Technical Characteristics

Input power	115 to 130 volts ac or 210 to 260 volts, 45 to 60 cps.
Output frequency	4 kc, 8 kc, 60 kc, 96 kc, and 128 kc (all outputs $\pm 0.1$ cps).
Frequency stability	Long term: Drifts do not exceed two parts in $10^7$ for each month of continuous operation. Short term: Three parts in $10^9$ for a 24-hour period.
Output level	-10 dbm $\pm 0.5$ db at 4 kc, 8 kc, 60 kc, 96 kc, and 128 kc (nominal). All output levels adjustable.
Output level stability	$\pm 2$ db from nominal for all specified environmental conditions.
Output impedance	600 $\pm 60$ ohms at 4 kc, 8 kc; 135 $\pm 13.5$ ohms at 60 kc, 96 kc, and 128 kc.
Changeover time	10 milliseconds (maximum).
Changeover level	$\pm 0.5$ -db difference (maximum) between operating and standby circuits.

### Variations with power

supply changes . . . . . Frequency:  $\pm 1$  cps  
Level:  $\pm 1\%$

Longitudinal balance. . . . 40 db (minimum) each output.

Operating temperature. . . 0 to 65 C. (32 F. to 149 F.).

Relative humidity . . . . . 0 to 95 percent.

Elevation . . . . . 10,000 ft (maximum).

Return loss . . . . . 20 db (minimum) each output.

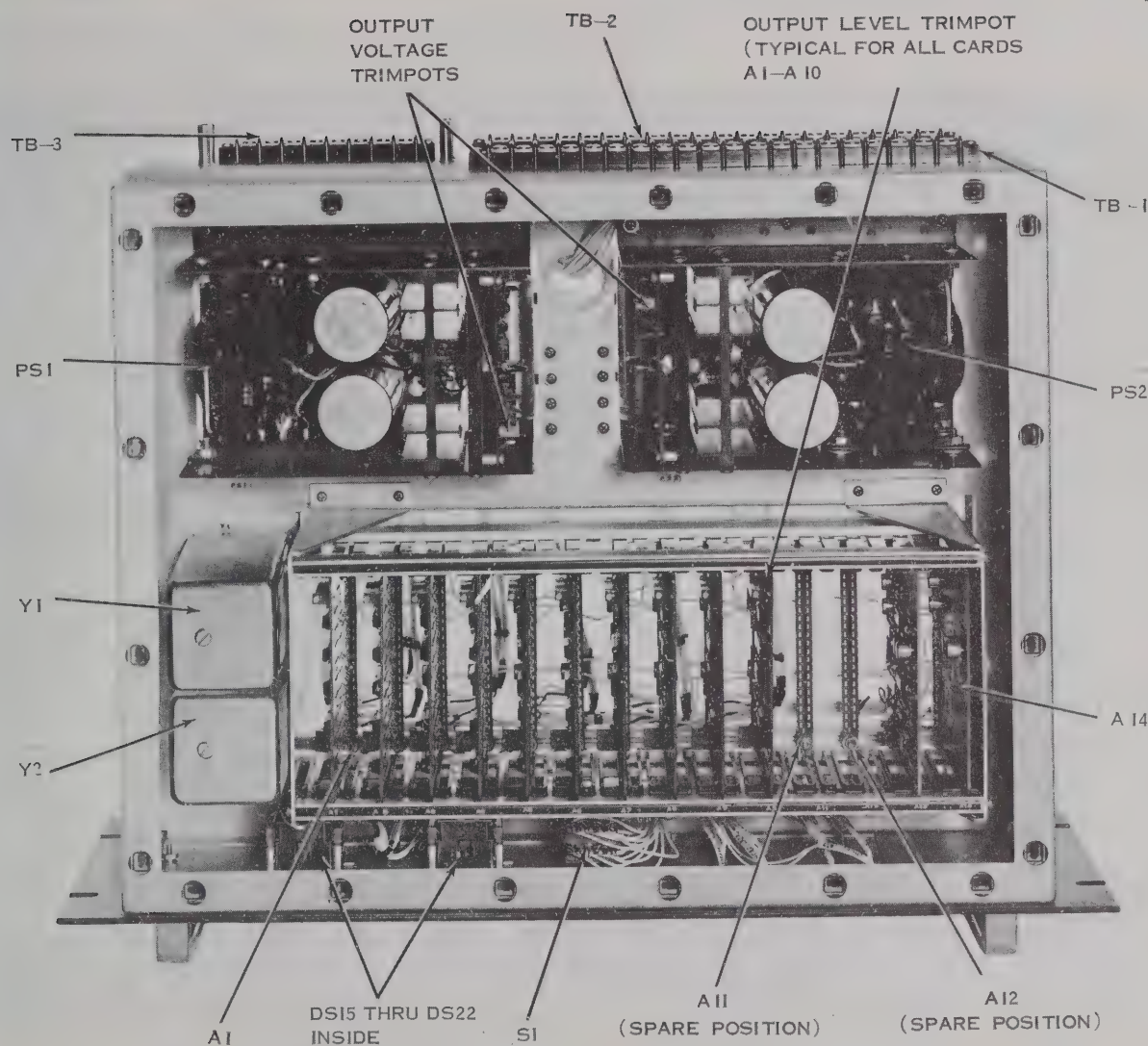
## 1-6. Items Comprising an Operable Equipment

Oscillator-Coupler O-1562/FCC comprises an operable equipment. The dimensions of Oscillator-Coupler O-1562/FCC are 19 by 13 by 15 inches.

## 1-7. Description

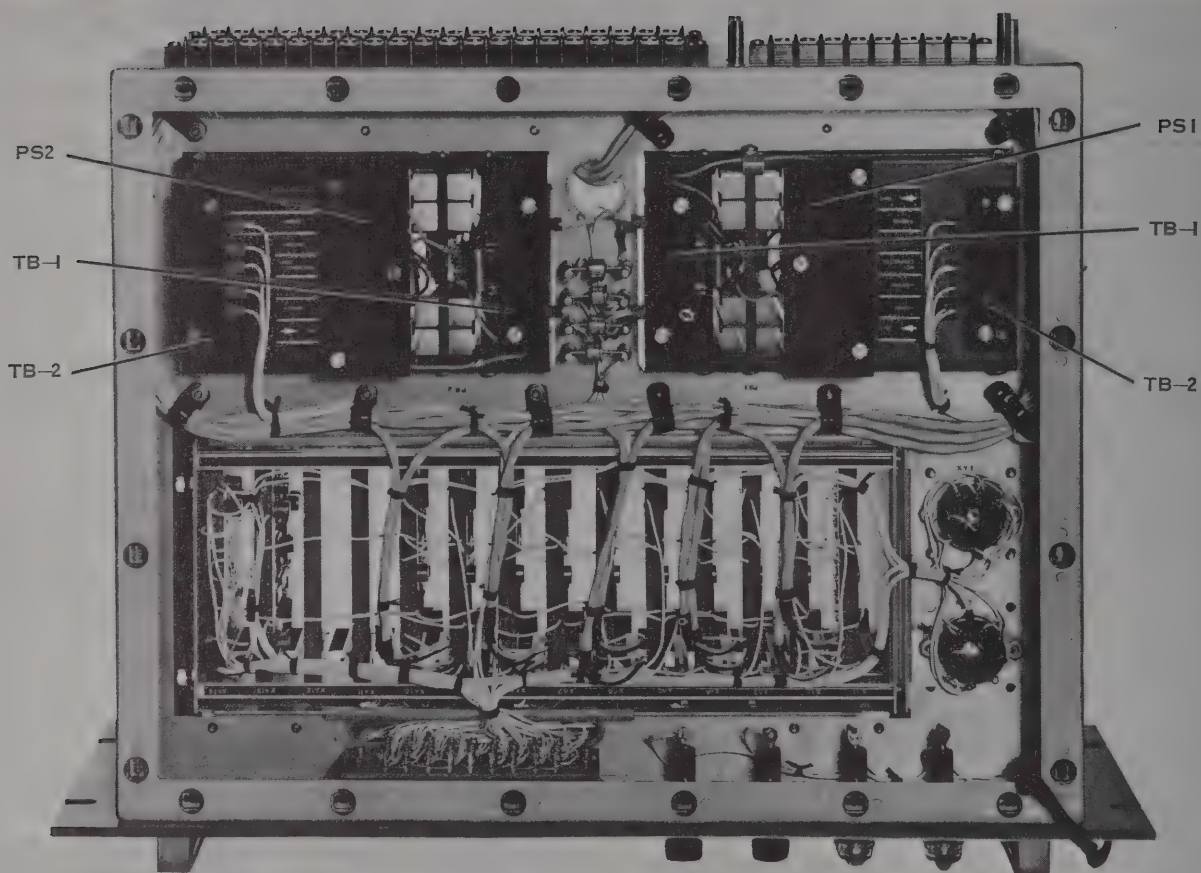
The oscillator-coupler is of solid-state modular design, containing 2 oscillator plug-in units, 12 printed circuit card assembly plug-in units, and 2 power supply assemblies (fig. 1-3). The oscillator plug-in units are fully transistorized and use 3.84-megacycle (mc) oven inclosed crystals as the frequency determining components. The oscillator units are mounted in vector-type aluminum cans that plug into octal sockets on the equipment chassis. The 12 printed circuit card assemblies contain both solid-state and integrated circuit components. These 12 cards are supported by bracket-mounted card guides. Electrical connections are made through 22-pin connectors on the bracket and through printed wiring terminals in the printed circuit card assemblies. Provision is made for two additional printed circuit card assemblies. The two power supply assemblies are physically mounted on the electronic equipment chassis. Electrical connections are made through terminal strips on the underside of the power supplies (fig. 1-4). All external connections to the oscillator-coupler are made through three terminal strips on the rear of the unit.





EL 5820-786-15-TM-3

Figure 1-3. Oscillator Coupler O-1562/FCC, top view (cover removed).



EL5820-786-15-TM-4

Figure 1-4. Oscillator-Coupler O-1562/FCC, bottom view (cover removed).



## CHAPTER 2

### INSTALLATIONS

---

#### 2-1. Siting

The oscillator-coupler is mounted in any standard 19-inch rack or cabinet. Allow sufficient clearance at the top of the unit to enable removal and replacement of internal assemblies and at the rear of the unit for external connections and performance of maintenance procedures. Provide adequate lighting to assure readability of front panel markings. A 115- or 220-volt alternating current (ac) power source is required to provide power for the operation of the oscillator-coupler.

#### 2-2. Packaging Data

The oscillator-coupler is packaged in a single carton, as shown in figure 2-1. Dimensions of the carton are 22 by 16 by 18 inches, the volume is 6,336 cubic inches, and the weight is 30 pounds (gross).

#### 2-3. Checking Unpacked Equipment

a. Inspect the equipment for damage that may have occurred during shipment. If the equipment has been damaged, fill out and forward DD Form 6 (para 1-3b).

b. Check to see that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the basic issue items list (app B). Report all discrepancies in accordance with TM 38-750. The equipment should be placed in service even though a minor assembly or part that does not affect proper functioning is missing.

c. Check to see whether the equipment has been modified. If the equipment has been modified, the MWO number will appear on the front

panel, near the nomenclature plate. Check also to see whether all MWO's current at the time the equipment is placed in use have been applied.

#### 2-4. Tools Required for Installation

The only item required for installation of the oscillator-coupler is Tool Kit, Electronic Equipment TK-105/G (FSN 5180-610-8177). Refer to SC 5180-91-CL-RO7 for information on use of this toolkit.

#### 2-5. Installation Instructions

##### NOTE

Installation shall be performed by the direct support or higher category maintenance personnel.

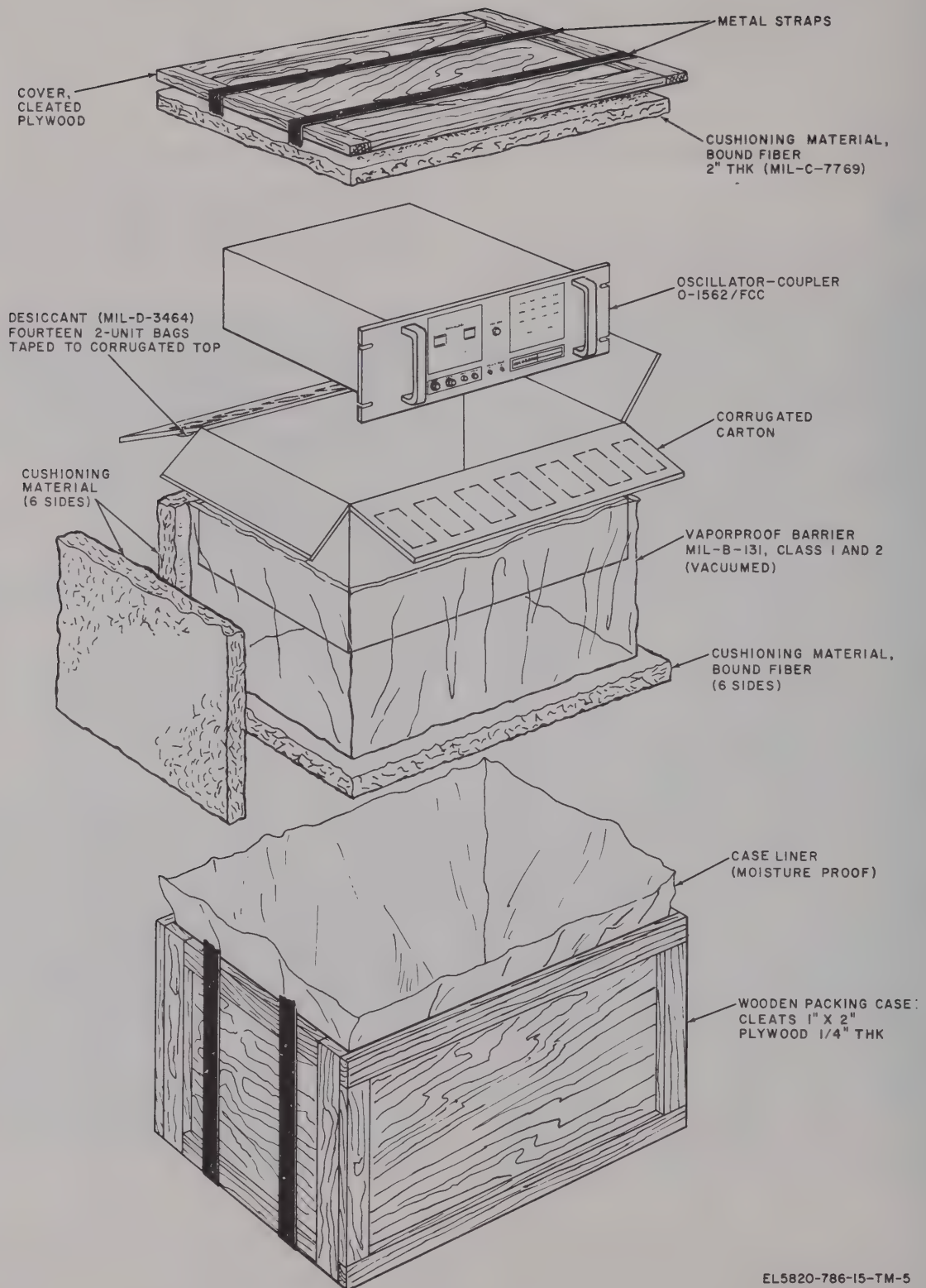
To install the oscillator-coupler, place it into a desired position on equipment rack, align slots with rack-mounting holes, and secure with four mounting screws (two on each side).

#### 2-6. Installation of Wiring and Cabling

When installation of the oscillator-coupler is completed, make required connections to terminal strips on the rear of the unit in accordance with station installation requirements. Terminate all unused output terminals; 600 ohms across terminals 2 and 3, and 5 and 6 of TB1 and TB2, and 135 ohms across all other terminals.

#### 2-7. Initial Checks and Adjustments

After application of power to the oscillator-coupler, perform initial tests in accordance with paragraphs 7-9 through 7-15.



EL5820-786-15-TM-5

Figure 2-1. Packaging data for Oscillator-Coupler O-1562/FCC.



## CHAPTER 3

### OPERATION

---

#### 3-1. General

Once the oscillator-coupler is installed it operates automatically; no starting or operating procedures are required. However, if a fault occurs, the operator must be capable of interpreting alarm indications and take remedial actions, if required.

#### 3-2. Controls and Indicators

Controls and indicators on the oscillator-coupler used by the operator are given below and shown in figure 1-1.

<i>Control or indicator</i>	<i>Function</i>
OPERATE lamp (green) on left (DS15, DS16) .....	Indicates primary oscillator is operating and on line.
ALARM lamp (red) (DS17, DS18) .....	Lights to indicate a failure in oscillator.
STANDBY lamp (amber) (DS19, DS20) .....	Lights when standby oscillator is in standby condition.
OPERATE lamp (green) on right (DS21, DS22) .....	Lights when standby oscillator is on line.
LAMP TEST pushbutton (S1) .....	Enables test of lamps A1 through A14.
POWER SUPPLIES 1 ON lamp .....	Lights when ac power is applied to power supply 1.
POWER SUPPLIES 2 ON lamp .....	Lights when ac power is applied to power supply 2.
F1 fuse indicator .....	Lights when fuse F1 is open.
F2 fuse indicator .....	Lights when fuse F2 is open.
A1 through A14 lamps (DS1 through DS14) .....	Monitor module operational status. Lamp associated with module goes on when failure occurs.





## CHAPTER 4

### MAINTENANCE INSTRUCTIONS

#### Section I. GENERAL REQUIREMENTS

##### 4-1. Scope of Maintenance

###### NOTE

The operator or the organizational maintenance man can perform the daily preventive checks and services.

The maintenance duties assigned to the operator and organizational maintenance repairmen include preventive maintenance checks and services, troubleshooting, and repair, as specified by the MAC. Specific maintenance duties are listed below with references to paragraphs covering the maintenance functions.

*a.* Operator's daily preventive maintenance checks and services (para 4-5).

*b.* Organizational monthly preventive maintenance checks and services (para 4-6).

*c.* Troubleshooting (para 4-7).

*d.* Replacement procedures (para 4-9).

*e.* Repainting and refinishing instructions (para 4-10).

##### 4-2. Tools and Test Equipment Required

Tools and test equipment required for organizational maintenance consist of—

*a.* Multimeter AN/USM-210 (FSN 6625-019-0815).

*b.* Tool Kit, Electronic Equipment TK-105/G (FSN 5180-610-8177).

#### Section II. PREVENTIVE MAINTENANCE

##### 4-3. Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services on the oscillator-coupler are performed daily in accordance with paragraph 4-5, monthly in accordance with paragraph 4-6, and under the following conditions:

*a.* When the unit is initially installed.

*b.* When the unit is reinstalled after being removed for any reason.

##### 4-4. Preventive Maintenance Checks and Services Charts

The preventive maintenance checks and services charts outline the checks and services to be made at specific intervals. These checks and services are presented in sequence No. order. The *Item to be inspected* column indicates the physical item or function to be checked; the *Procedure* column indicates the check to make; the *References* column is for use by the organizational maintenance personnel only and references applicable paragraphs for troubleshooting and corrective maintenance.

##### 4-5. Operator's Daily Preventive Maintenance Checks and Services Chart

Preventive maintenance daily checks and services are listed in the following chart:

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
1	Cleaning -----	Clean exterior of cabinet with soft brush or cloth.	None.
2	Visual inspection -----	Visually inspect cabinet for rust spots and scratches. Touch up paint, if required.	Para 4-10.

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
3	Lamp test -----	Depress LAMP TEST pushbutton on front panel, and see that lamps A1 through A14 are on.	Para 4-9c.
4	Oscillator status -----	See that OPERATE lamp at left and STANDBY lamp at right are on and ALARM lamp on left and OPERATE lamp at right are off.	None.
5	Power supply status -----	See that POWER SUPPLIES 1 and 2 lamps are on.	None.

#### 4-6. Organizational Monthly Preventive Maintenance Checks and Services Chart

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
1	Connectors -----	Inspect for snug fit and good contact.	None.
2	Transformer terminals -----	Inspect terminals on power supplies. There should be no evidence of rust or corrosion.	None.
3	Terminal blocks -----	Inspect for loose connections, cracked or broken insulation.	None.
4	Circuit card assemblies -----	Inspect resistors, capacitors, integrated circuits for cracks, blistering, discoloration, or other evidence of deterioration.	Para 4-9d.
5	Interior -----	Clean interior of cabinet -----	None.

### Section III. ORGANIZATIONAL MAINTENANCE

#### 4-7. Use of Troubleshooting Chart

The organizational troubleshooting chart (para 4-8) is based primarily on the trouble symptoms that may be observed while performing operational checks and the preventive maintenance checks and services chart. When an abnormal symptom is observed, refer to the applicable

*Trouble symptom* column in the troubleshooting chart. The *Probable trouble* column lists the items probably responsible for the abnormal symptom. The *Checks and corrective measures* column provides definite measures to correct the trouble. If the measures provided do not correct the fault, the next highest maintenance category is required.

#### 4-8. Troubleshooting Chart

<i>Item No.</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measures</i>
1	Lamps A1 through A14 and power supplies 1 and 2 lamps are not on when LAMP TEST button is depressed.	Lamps not lighted are defective -----	Replace applicable lamps (para 4-9c).
2	OPERATE lamp at left is off; OPERATE lamp at right and ALARM and STANDBY lamps are on.	a. Fuse F1 or F2 open ----- b. Oscillator Y1 defective ----- c. Power supply PS1 defective ---	a. Replace defective fuse (para 4-9a). b. Replace oscillator Y1 (para 4-9d). c. Higher category maintenance required.
3	STANDBY and OPERATE lamp on right and ALARM and STANDBY lamps are off; OPERATE lamp on left is on.	a. Fuse F3 or F4 open ----- b. Oscillator Y2 defective ----- c. Power supply PS2 defective -----	a. Replace defective fuse (para 4-9a). b. Replace oscillator Y2 (para 4-9d). c. Higher category maintenance required.



<i>Item No.</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measures</i>
4	POWER SUPPLIES 1 lamp is off.	Fuse F1 of F2 open .....	Replace defective fuse (para 4-9a).
5	POWER SUPPLIES 2 lamp is off.	Fuse F3 or F4 open .....	Replace defective fuse (para 4-9a).
6	Indicator lamps are on:		
	A1 .....	4-kc divider circuit card assembly A1 defective.	Replace A1 (para 4-9d).
	A2 .....	4-kc divider circuit card assembly A2 defective.	Replace A2 (para 4-9d).
	A3 .....	8-kc divider circuit card assembly A3 defective.	Replace A3 (para 4-9d).
	A4 .....	8-kc divider circuit card assembly A4 defective.	Replace A4 (para 4-9d).
	A5 .....	60-kc divider circuit card assembly A5 defective.	Replace A5 (para 4-9d).
	A6 .....	60-kc divider circuit card assembly A6 defective.	Replace A6 (para 4-9d).
	A7 .....	96-kc divider circuit card assembly A7 defective.	Replace A7 (para 4-9d).
	A8 .....	96-kc divider circuit card assembly A8 defective.	Replace A8 (para 4-9d).
	A9 .....	128-kc divider circuit card assembly A9 defective.	Replace A9 (para 4-9d).
	A10 .....	128-kc divider circuit card assembly A10 defective.	Replace A10 (para 4-9d).
	A13 .....	Combine and driver circuit card assembly A13 defective.	Replace A13 (para 4-9d).
	A14 .....	Combine and driver circuit card assembly A14 defective.	Replace A14 (para 4-9d).
7	OPERATE and ALARM lamps on left are off, OPERATE lamp on right is off, and STANDBY lamp is on.	OPERATE lamp on left defective ...	Replace lamp (para 4-9b).
8	OPERATE and ALARM lamps on left are off, OPERATE lamp on right is on, and STANDBY lamp is off.	ALARM lamp defective .....	Replace lamp (para 4-9b).

#### 4-9. Replacement Procedures

*a. Replacement of Fuses.* The fuses on the oscillator-coupler front panel (fig. 1-1) are replaced as follows:

(1) Depress the fuseholder cap, and turn it counterclockwise to unlock it.

(2) Pull out the fuseholder cap and defective fuse, and discard the defective fuse.

(3) Insert the replacement fuse in the fuseholder cap, insert fuseholder cap into fuseholder, depress the cap, and turn it clockwise to lock it in place.

*b. Replacement of Oscillator Status Lamps.* Replace oscillator status lamps (fig. 1-1) as follows:

(1) Remove indicator lens for defective indicator by pulling straight out from front panel.

(2) Remove colored boot (red, amber, or green) from lamp.

(3) Remove defective lamp by depressing and turning it counterclockwise a fraction of a turn to release it from its socket.

(4) Insert replacement lamp in the lamp socket, depress and turn clockwise to lock it in place.

(5) Replace boot over lamp.

(6) Depress indicator lens.

*c. Replacement of Power Supply and Circuit Card Status Lamps.* Replace the power supply circuit card status lamps on the oscillator-coupler front panel (fig. 1-1) as follows:

(1) Remove top cover from oscillator-coupler.

(2) Disconnect the two leads connected to the rear terminals of the defective lamp assembly.

(3) Remove nut that secures lamp assembly to front panel.

(4) Remove lamp assembly by pulling it straight out from front panel.

(5) Insert new lamp assembly into front panel.

(6) Secure with nut removed in (3) above.

(7) Connect leads to rear terminals of lamp assembly.

(8) Replace top cover on oscillator-coupler.

*d. Replacement of Circuit Card Assemblies and Oscillators.* Replace a circuit card assembly or oscillator (fig. 1-3) as follows:

(1) Remove top cover from oscillator-coupler.

(2) Remove circuit card assembly from

connector or oscillator from socket by grasping and pulling straight upward.

(3) Insert new circuit card or oscillator by pressing downward, assuring that the circuit card is firmly seated in its connector.

(4) Replace top cover on oscillator-coupler.

#### **4-10. Repainting and Refinishing Instructions**

*a.* Paint required for this equipment is semigloss enamel, Specification No. TT-E-529, or gloss enamel, TT-E-849, as applicable, matching the finish and color as close as possible.

*b.* Refer to the cleaning and refinishing practices specified in TB 746-10 and TM 9-213.



## CHAPTER 5

### SHIPMENT AND LIMITED STORAGE AND DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

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#### Section I. SHIPMENT AND LIMITED STORAGE

##### 5-1. Disassembly

Disassembly of the oscillator-coupler is not required for shipment. Reverse the procedures given in paragraphs 2-5 and 2-6 to prepare the unit for repackaging.

##### 5-2. Repackaging

Repackaging of equipment for shipment or lim-

ited storage will normally be performed at a packaging facility or by a repackaging team. If emergency packaging is required, select the materials from those listed in SB 38-100. Package the equipment in accordance with the original packaging so far as possible, with the available materials.

#### Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

##### 5-3. Authority for Demolition

Demolition of the equipment will be accomplished only upon order of the commander. Use the destruction procedure outlined in paragraph 5-4 to prevent further use of the equipment.

##### 5-4. Methods of Destruction

Destruction of equipment to prevent capture or abandonment to the enemy may be accomplished by smashing with tools, such as axes, hammers, or sledges, as available.





## CHAPTER 6

### FUNCTIONING OF EQUIPMENT

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#### 6-1. Frequency Generation Circuits

For primary frequency stability and accuracy, the oscillator-coupler utilizes two highly stable crystal oscillators (Y1 and Y2, fig. 6-1). The output of each oscillator is continuously monitored by alarm detectors on combiner and driver card assemblies A13 and A14. Each alarm detector samples the amplitude output of the oscillator, and the output of an internal thermostat located within the oscillator. The thermostat provides an indirect measurement of the oven condition. The oscillator, which reaches output voltage and operating temperature first, is switched in by A13 and A14 to operate the system. The output of the oscillator driving the system is fed to the frequency divider circuits on circuit card assemblies A1-A10 (fig. 1-3). The oscillators operate at 3.84 mc. To generate the required 128kc output, 3.84mc is divided by 30 on 128kc divider circuit card assemblies A9 and A10. By dividing the 3.84mc signal by 15, an output frequency of 256kc is derived. A following divide-by-2 circuit turns this output into a 128kc output. The derivation of the other required output frequencies begins with a common divide-by-4 on each of the remaining circuit card assemblies. The output of the divide-by-4 is 960kc. The 60kc signal from 60kc divider circuit card assemblies A5 and A6 is derived by dividing 960kc by 16. The 960kc frequency is divided by 10 to provide 96kc outputs from 96kc divider circuit card assemblies A7 and A8. The 960kc signal is fed through a divide-by-10 and a divide-by-12 circuit to obtain the 8kc outputs from 8kc divider circuit card assemblies A3 and A4. The 4kc output from 4kc divider circuit card assemblies A1 and A2 is derived by feeding a 960kc signal through divide-by-10, divide-by-12, and divide-by-2 circuits.

#### 6-2. Monitoring and Automatic Changeover Circuits

The status of each oscillator is continuously monitored, and displayed on the front panel. A green lamp indicates which crystal oscillator is providing the operating signal. When the green OPER-ATE lamp above the STANDBY lamp is on, the backup oscillator is supplying the operating signal. When the STANDBY lamp is on, the backup oscillator is in a standby condition. The status of the frequency divider circuits is also displayed on the front panel. When the operational capability of a frequency divider falls below established levels, a red indicator lamp (A1-A14) goes on to indicate a failure. The automatic changeover circuits provide a switch to the backup oscillator in the event of any failure of the operating oscillator in a time not to exceed 10 milliseconds (ms). The automatic changeover takes place when an output drops below the required level. The oscillator oven temperature is continuously monitored by use of a thermostat that is used to perform the oven control. This thermostat gives an indirect indication of the temperature of the oven, thereby providing an indirect monitor of the oscillator frequency output. If a failure should occur, the chargeover will automatically take place, with the indication of the failure displayed on the front panel. This action will allow the nonoperating oscillator to be removed from the system and replaced by a spare, while operation is not disturbed. All frequency divider circuits are duplexed, and the automatic changeover circuits provide a switchover when the output level drops 2 db from the established level. Power supplies PS1 and PS2 provide 5 volts direct current (dc) operating power for all components of the oscillator-coupler.

*Figure 6-1. Oscillator-Coupler O-1562/FCC,  
block diagram.*

(Located in back of manual)



## CHAPTER 7

### DIRECT SUPPORT MAINTENANCE

#### Section I. GENERAL

##### 7-1. Scope of Direct Support Maintenance

###### NOTE

All circuit card assemblies, oscillators, or power supplies found to be defective as a result of direct support testing and troubleshooting should be returned to the depot maintenance area for repair (SB 11-497).

The direct support maintenance procedures provided in this chapter supplement the organizational maintenance procedures given in chapter 4. These procedures cover all repairs to be made on a site or on a repair and return to site basis. Instructions for troubleshooting, removal and replacement, adjustment and alignment, and testing are provided as authorized by the maintenance allocation charts.

##### 7-2. Tools, Test Equipment, and Materials Required

The following tools, test equipment, and materials are required for direct support maintenance.

<i>Manufacturer's nomenclature</i>	<i>Equivalent official nomenclature or FSN</i>
Multimeter, Simpson 260 ---	Multimeter AN/USM-210.
Ac voltmeter, HP-3400A ---	Ac Voltmeter ME-318/U.
Decade resistor, GR-1434G -	6625-067-9025.

<i>Manufacturer's nomenclature</i>	<i>Equivalent official nomenclature or FSN</i>
VLF comparator HP-117A--	6625-902-7571.
Frequency converter, CML NS-70-2A.	
Variac, GR W10MT3A -----	6120-054-7794.
Frequency counter, HP-5245L.	Frequency Counter CP-772/U or AN/USM-207.
Test Cable, HP-11086A	
Test cable, Pomona 2BC-AL-24.	
Test cable, Pomona AL-C-BNC-24.	
Resistor, 133 ohms, ½ watt, 1%, RN 65D1330F (6 required).	
Resistor, 604 ohms, ½ watt, 1%, RN 65D6040F (4 required).	
Resistor, 300 ohms, ½ watt, ¼ %, RN 65F3000C (2 required).	
Adapter BNC-TEE, UG-274	
Resistor, 150 ohms, ½ watt, 5%, RC 20GF151J.	
Resistor, 33 ohms, ½ watt, 5%, RC 20GF330J.	
Resistor, 67.5 ohms, ½ watt, ¼ %, RN 65F67R5F (2 required).	
Test cable, RG-274 with male BNC connector at one end and Amphenol 27-1 connector at other end.	

#### Section II. DIRECT SUPPORT TROUBLESHOOTING

##### 7-3. Use of Troubleshooting Chart

Direct support troubleshooting procedures are used to supplement the organizational troubleshooting procedures provided in chapter 4 and are used to isolate a fault in the oscillator-coupler to a defective subassembly. The troubleshooting procedures are based on the overall bench tests of the oscillator-coupler provided in paragraphs 7-9 through 7-16. References to the test procedures

in which the fault symptoms listed would be observed are provided in the symptom column. When an output level or frequency performance standard is not met, refer to the related trouble symptom in the *Trouble symptom* column of the troubleshooting chart. The *Probable trouble* column lists the items probably causing the malfunction, the *Checks and corrective measures* column references the action to be used to remedy the malfunction.



## 7-4. Troubleshooting Chart

<i>Item No.</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measures</i>
1	Output frequency across TB1-2 and TB1-3 or TB2-2 and TB2-3 not $4\text{ kc} \pm 0.1\text{ cps}$ (para 7-10).	4-kc divider circuit card A1 or A2 ..	Remove A1. If fault is corrected, replace A1; if not corrected, replace A2.
2	Output frequency across TB1-5 and TB1-6 or TB2-5 and TB2-6 not $8\text{ kc} \pm 0.1\text{ cps}$ (para 7-10).	8-kc divider circuit card A3 or A4 ..	Remove A3. If fault is corrected, replace A3; if not corrected, replace A4.
3	Output frequency across TB1-8 and TB1-9 for TB2-8 and TB2-9 not $60\text{ kc} \pm 0.1\text{ cps}$ (para 7-10).	60-kc divider circuit card A5 or A6 ..	Remove A5. If fault is corrected, replace A5; if not corrected, replace A6.
4	Output frequency across TB1-11 and TB1-12 or TB2-11 or TB2-12 not $96\text{ kc} \pm 0.1\text{ cps}$ (para 7-10).	96-kc divider circuit card A7 or A8 ..	Remove A7. If fault is corrected, replace A7; if not corrected, replace A8.
5	Output frequency across TB1-14 and TB1-15 or TB2-14 or TB2-15 not $128\text{ kc} \pm 0.1\text{ cps}$ (para 7-10).	128-kc divider circuit card A9 or A10.	Remove A8. If fault is corrected, replace A9; if not corrected, replace A10.
6	Output level across TB1-2 and TB1-3 or TB2-2 and TB2-3 not $-10 \pm 0.5\text{ dbm}$ (para 7-10).	4-kc divider circuit card A1 or A2 ...	Refer to adjustment procedures (para 7-8a). If output level cannot be adjusted, replace faulty card.
7	Output level across TB1-5 and TB1-6 or TB2-5 and TB2-6 not $-10 \pm 0.5\text{ dbm}$ (para 7-10).	8-kc divider circuit card A3 or A4	Same as item No. 6, except refer to para 7-8b.
8	Output level across TB1-8 and TB1-9 or TB2-8 and TB2-9 not $-16.5 \pm 0.5\text{ dbm}$ (para 7-10).	60-kc divider circuit card A5 or A6 ..	Same as item No. 6, except refer to para 7-8c.
9	Output level across TB1-1 and TB1-12 or TB2-11 and TB2-12 not $-16.5 \pm 0.5\text{ dbm}$ (para 7-10).	96-kc divider circuit card A7 or A8..	Same as item No. 6, except refer to para 7-8d.
10	Output level across TB1-14 and TB1-15 or TB2-14 or TB2-15 not $-16.5 \pm 0.5\text{ dbm}$ (para 7-10).	128-kc divider circuit card A9 or A10.	Same as item No. 6, except refer to para 7-8e.

## Section III. ADJUSTMENT, REMOVAL, AND REPLACEMENT

### 7-5. Power Supply Removal

Remove the power supply subassemblies from the oscillator-coupler as indicated below. The procedure is identical for each supply.

a. Remove the covers from TB1 and TB2 on the lower part of the power supply (fig. 1-4).

b. Remove all leads from TB1 and TB2 on power supply, and tag accordingly to be sure of correct reconnection to the new power supply.

c. Remove the six 4-40 by 0.25 inch machine screws that secure the power supply to the oscillator-coupler chassis.

d. Remove the power supply from the oscillator-coupler.

### 7-6. Power Supply Replacement

To install a new power supply in the oscillator-coupler, reverse the power supply removal procedure provided in paragraph 7-5.

### 7-7. Power Supply Adjustment

Adjust the power supply PS1 and PS2 output voltage levels, after installing the oscillator-coupler as follows:

a. Connect Multimeter AN/USM-210 leads across + OUTPUT and - OUTPUT terminals on power supply (fig. 1-4).

b. Adjust trimpot on top of power supply (fig. 1-3) for  $5 \pm 0.25$  volts dc indication on multimeter.

## 7-8. Circuit Card Output Level Adjustment Procedures

The following adjustment procedures are to be performed after inserting a new circuit card assembly into the oscillator-coupler, or when an incorrect level is observed during testing or troubleshooting.

a. *4-Kc Divider Circuit Card Assemblies A1, A2.* Adjust the output level of 4-dc divider circuit card assemblies A1 and A2 as follows:

(1) Connect 604-ohm terminations across output terminals TB1-2 and TB1-3 and TB2-2 and TB2-3.

(2) Connect ac voltmeter across TB1-2 and TB1-3, using Pomona AL-C-BNC-24 test cable.

(3) Remove 4-kc divider circuit card A2 from the oscillator-coupler.

(4) Adjust trimpot on A1 until ac voltmeter provides a  $-10 \pm 0.5$  dbm indication.

(5) Remove A1 from oscillator-coupler, and replace A2.

(6) Adjust trimpot on A2 until ac voltmeter provides a  $-10 \pm 0.5$  dbm indication.

(7) Replace A1 in oscillator-coupler.

b. *8-Kc Divider Circuit Card Assemblies A3, A4.* To adjust output level of the 8-kc divider circuit card assemblies, terminate TB1-5 and TB1-6 and TB2-5 and TB2-6 with 600-ohm terminations. Repeat the procedure given in a(2) through (7) above, substituting A3 and A4 for A1 and A2.

c. *60-Kc Divider Circuit Card Assemblies A5, A6.* Terminate TB1-8 and TB1-9 and TB2-8 and TB2-9 with 133-ohm resistors. Repeat the procedure given in a(2) through (7) above, substituting A5 and A6 for A1 and A2. The output level is adjusted for a  $-16.5 \pm 0.5$  dbm ac voltmeter indication.

d. *96-Kc Divider Circuit Card Assemblies A7, A8.* Terminate TB1-11 and TB1-12 and TB2-11 and TB2-12 with 133-ohm resistors. Perform the procedure given in a(2) through (7) above, substituting A7 and A8 for A1 and A2. The output level is adjusted for  $-16.5 \pm 0.5$  dbm on the ac voltmeter.

e. *128-Kc Divider Circuit Card Assemblies A9, A10.* Terminate TB1-14 and TB1-15 and TB2-14 and TB2-15 with 133-ohm resistors. Perform the procedure given in a(2) through (7) above, substituting A9 and A10 for A1 and A2. The output level is adjusted for  $-16.5 \pm 0.5$  dbm on the ac voltmeter.

## Section IV. DIRECT SUPPORT TEST PROCEDURES

### 7-9. General

a. Direct support test procedures are performed to determine whether the equipment is operating satisfactorily for return to users after repair. These procedures set forth specific requirements that the repaired equipment must meet before it is returned to the using organization.

b. Comply with the instructions preceding each performance test procedure before proceeding to actual test. For each test, perform the actions required in the *Control settings* column. Compare the indications on the test equipment with the requirements in the *Performance standard* column.

### 7-10. Output Level and Frequency Test

a. *Test Equipment and Materials.*

(1) Ac Voltmeter ME-318/U.

(2) Frequency Counter CP-772/U.

(3) Resistor, 604 ohms,  $\frac{1}{2}$  w, 1 percent (as required).

(4) Resistor, 133 ohms,  $\frac{1}{2}$  w, 1 percent (as required).

(5) Test cable, Pomona AL-C-BNC-24.

(6) Test Cable HP-11086A.

b. *Test Connections and Conditions.*

(1) Connect test equipment as shown in figure 7-1.

(2) Terminate all unused output terminals on TB1 and TB2 using resistor values shown for applicable terminals.

(3) Turn on equipment and allow it to warm up for at least 30 minutes.

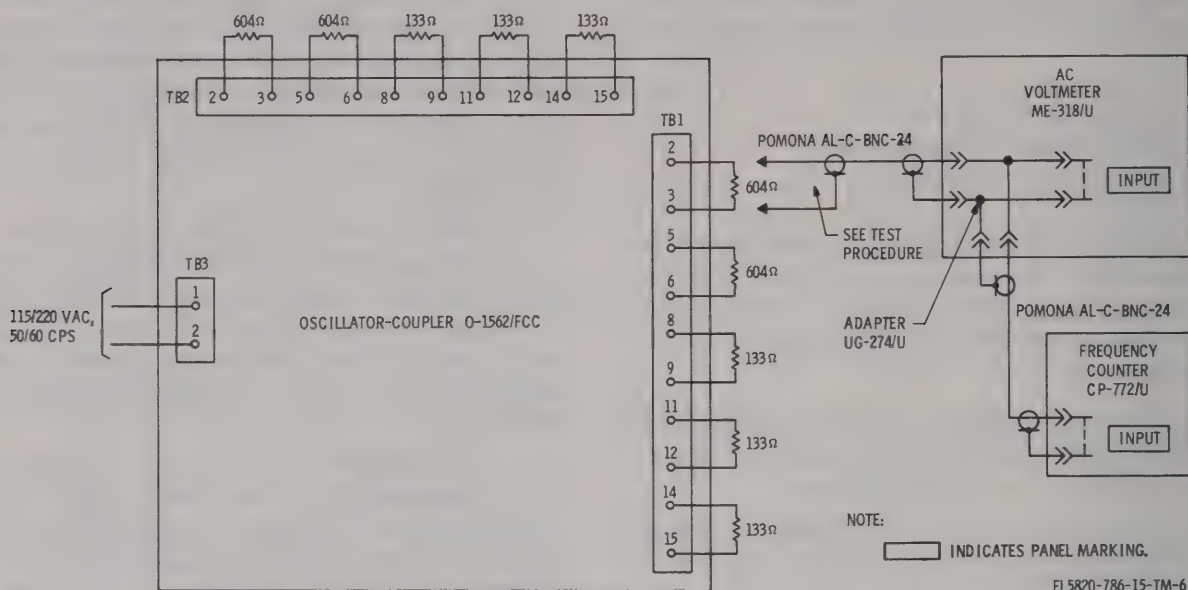


Figure 7-1. Output level and frequency test setup.

### c. Procedure.

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
1	Ac Voltmeter ME-318/U: ----- RANGE: +10 DB. Frequency Counter CP-772/U: ----- SENSITIVITY (VOLTS RMS): 10 TIME BASE: 0.1 FUNCTION: FREQUENCY		Connect ac voltmeter to terminals 2 and 3 of TB1. Measure level and frequency.	-10 $\pm$ 0.5 dbm, 4 kc $\pm$ 0.1 cps.
2	Same as step No. 1 -----		Repeat step No. 1 at terminals 2 and 3 of TB2, 5 and 6 of TB1, and 5 and 6 of TB2.	-10 $\pm$ 0.5 dbm, 4 kc $\pm$ 0.1 cps at terminals 2 and 3 of TB2, 8 kc $\pm$ 0.1 cps at terminals 5 and 6 of TB1 and TB2.
3	Same as step No. 1 -----		Repeat step No. 1 at terminals 8 and 9, 11 and 12, and 14 and 15 of TB1 and TB2.	-10 $\pm$ 0.5 dbm (meter will indicate -16.5 $\pm$ 0.5 dbm), 60 kc $\pm$ 0.1 cps at terminals 8 and 9 of TB1 and TB2. 96 kc $\pm$ 0.1 cps at terminals 11 and 12 of TB1 and TB2, 128 kc $\pm$ 0.1 cps at terminals 14 and 15 of TB1 and TB2.

## 7-11. Changeover System Test

### a. Test Equipment and Materials.

- (1) Ac Voltmeter ME-318/U.
- (2) Test cable, Pomona AL-C-BNC-24.

(3) Resistor, 604 ohm, 0.5 watt, 1 percent (as required).

(4) Resistor, 133 ohms, 0.5 watt, 1 percent (as required).



(5) Tool Kit, Electronic Equipment TK-105/G.

*b. Test Connections and Conditions.*

(1) Connect test equipment as shown in figure 7-2.

(2) Terminate all unused output terminals on TB1 and TB2 using values shown for applicable terminals.

(3) Remove oscillator-coupler top cover to enable removal and replacement of plug-in modules.

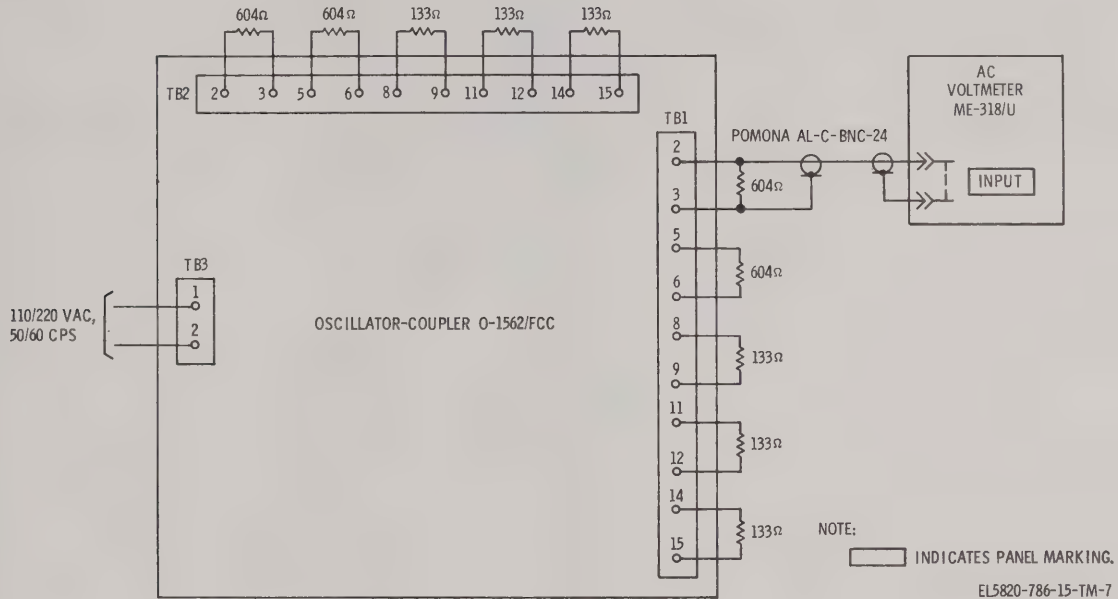


Figure 7-2. Changeover system test setup.

*c. Procedure.*

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
1	Ac Voltmeter ME-318/U: RANGE: +10 db		Record ac voltmeter indication with equipment connected as shown in figure 7-3.	-10 ±0.5 dbm (meter reads 0 db).
2	Same as step No. 1		Remove oscillator Y1 from socket.	Ac voltmeter indication remains constant within ±0.5 db.
3	Same as step No. 1		Replace oscillator Y1, and remove oscillator Y2.	Same indication as step No. 2.
4	Same as step No. 1		Replace oscillator Y2, and remove 4-kc divider circuit card assembly A1.	Same indication as step No. 2.
5	Same as step No. 1		Replace 4-kc divider circuit card assembly A1, and remove A2.	Same indication as step No. 2.
6	Same as step No. 1		Replace 4-kc divider circuit card assembly A2.	None.
7	Same as step No. 1		Adjust potentiometer on circuit card assembly A1 until ac voltmeter indication drops 2 db.	Output level indication automatically returns to initial level (-10 ±0.5 db).
8	Same as step No. 1		Remove 4-kc divider circuit card assembly A2. Readjust potentiometer on A1 for -10 ±0.5 db indication on ac voltmeter.	None.

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard																		
9	Same as step No. 1		Replace 4-kc divider circuit card assembly A2. Adjust potentiometer on A2 until ac voltmeter indication drops 2 db.	Same indication as step No. 7.																		
10	Same as step No. 1		Remove 4-kc divider circuit card assembly A1. Readjust potentiometer on A2 for $-10 \pm 0.5$ db indication on ac voltmeter.	None.																		
11	Same as step No. 1		Replace 4-kc divider circuit card assembly A1.	None.																		
12	Same as step No. 1		Repeat steps No. 4 through 11 for remaining output terminals on TB1, removing and placing the following circuit card assemblies associated with the applicable output terminals:	Same indication as step No. 2 and 7.																		
			<table><tr><th>Terminals</th><th>Circuit card assembly</th></tr><tr><td>TB1-5 and -6</td><td>8-kc divider</td></tr><tr><td>TB2-5 and -6</td><td>A3, A4</td></tr><tr><td>TB1-8 and -9</td><td>60-kc divider</td></tr><tr><td>TB2-8 and -9</td><td>A5, A6</td></tr><tr><td>TB1-11 and -12</td><td>96-kc divider</td></tr><tr><td>TB2-11 and -12</td><td>A7, A8</td></tr><tr><td>TB1-14 and -15</td><td>128-kc divider</td></tr><tr><td>TB2-14 and -15</td><td>A9, A10</td></tr></table>	Terminals	Circuit card assembly	TB1-5 and -6	8-kc divider	TB2-5 and -6	A3, A4	TB1-8 and -9	60-kc divider	TB2-8 and -9	A5, A6	TB1-11 and -12	96-kc divider	TB2-11 and -12	A7, A8	TB1-14 and -15	128-kc divider	TB2-14 and -15	A9, A10	
Terminals	Circuit card assembly																					
TB1-5 and -6	8-kc divider																					
TB2-5 and -6	A3, A4																					
TB1-8 and -9	60-kc divider																					
TB2-8 and -9	A5, A6																					
TB1-11 and -12	96-kc divider																					
TB2-11 and -12	A7, A8																					
TB1-14 and -15	128-kc divider																					
TB2-14 and -15	A9, A10																					
			<p><b>NOTE</b></p> <p>For 133-ohm terminations, reduce output level by 0.02 <math>\pm 0.007</math> volt. Readjust output level to 0.116 volt (<math>-16.5</math> db).</p>																			

7-12. Output Circuit Isolation Test

- a. Test Equipment and Materials.
 

(1) Ac Voltmeter ME-318/U.
 (2) Resistor, 604 ohms,  $\frac{1}{2}$  watt, 1 percent (as required).
 (3) Resistor, 133 ohms,  $\frac{1}{2}$  watt, 1 percent (as required).
- b. Test Connections and Conditions.
 

(1) Connect the test equipment as shown in figure 7-2.
 (2) Terminate all unused output terminals on TB1 and TB2 using resistor values shown for applicable terminals.
- c. Procedure.

Step No.	Control settings		Test procedure	Performance standard
	Test equipment	Equipment under test		
1	Ac Voltmeter ME-318/U: RANGE: +10 db		Connect ac voltmeter across terminals 2 and 3 of TB1, and record voltmeter decibel indication.	$-10 \pm 0.5$ db (meter reads 0 db).
2	Same as step No. 1		Connect a jumper across terminals 2 and 3 of TB2 and record voltmeter indication.	Voltmeter indication within 0.5 db of that indicated in step No. 1.

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
3	Same as step No. 1		Remove jumper and 604 ohms resistor from terminals 2 and 3 of TB2.	Same indication as step No. 2.
4			Reconnect 604-ohm resistor across terminals 2 and 3 of TB2. Connect ac voltmeter across this resistor.	None.
5	Same as step No. 1		Connect jumper across terminals 2 and 3 of TB1.	Same indication as step No. 2.
6	Same as step No. 1		Remove jumper and 604-ohm termination from terminals 2 and 3 of TB1.	Same indication as step No. 2.
7	Same as step No. 1		Repeat steps No. 1 through 6 for each set of output terminals (5 and 6, 8 and 9, 11 and 12, 14 and 15 on TB1 and TB2). Use 604-ohm termination for terminals 5 and 6, 135-ohm terminations for all other terminals.	Same indication as step No. 2.

### 7-13. Output Impedance Test

#### a. Test Equipment and Material.

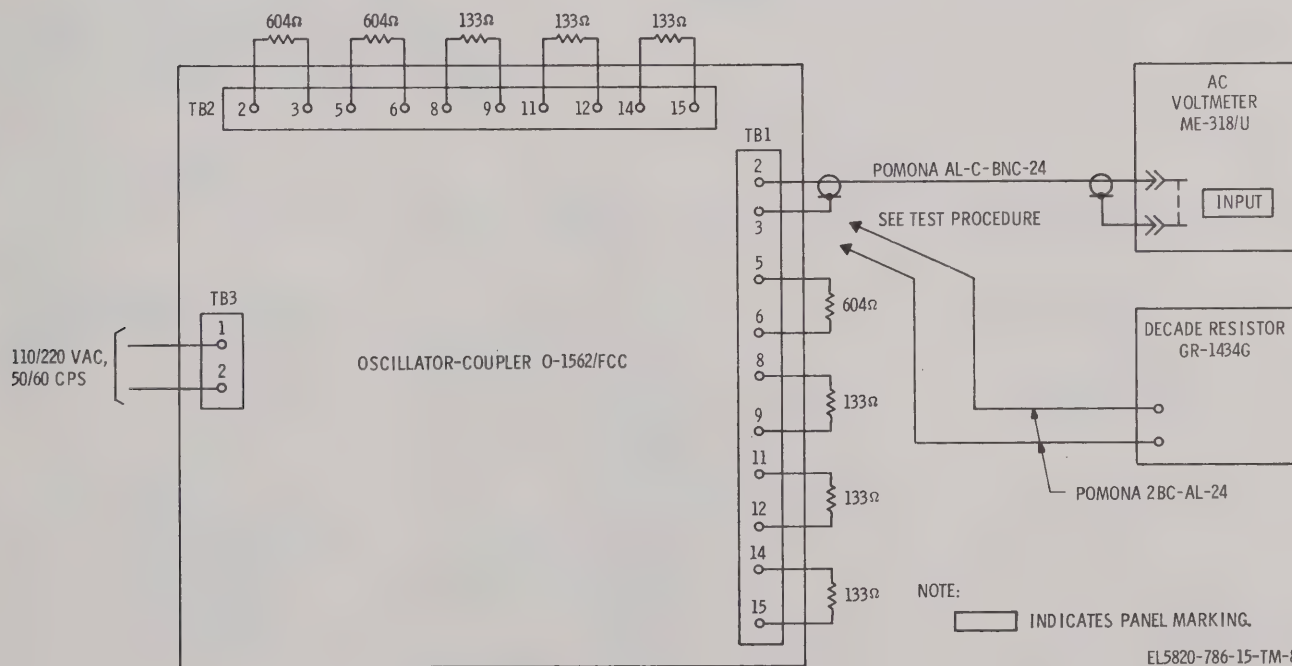
- (1) Ac Voltmeter ME-318/U.
- (2) Decade resistor, GR 1434G.
- (3) Test cable, Pomona 3BC-AL-24.
- (4) Resistor, 604 ohms,  $\frac{1}{2}$  watt, 1 percent (as required).

(5) Resistor, 133 ohms,  $\frac{1}{2}$  watt, 1 percent (as required).

#### b. Test Connections and Conditions.

(1) Connect test equipment as shown in figure 7-3.

(2) Terminate all unused output terminals with proper value resistances as shown in figure 7-4.



EL5820-786-15-TM-8

Figure 7-3. Output impedance test setup.



*c. Procedure.*

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
1	Ac Voltmeter ME-318/U: RANGE: -10B.		Measure the open circuit (unterminated) level across terminals 2 and 3 of TB1 on ac voltmeter and record.	-4 ±0.5 dbm.
2	Same as step No. 1 .....		Connect decade resistor across terminals 2 and 3 of TB1 and adjust until a level of exactly one-half the open circuit level is measured on ac voltmeter. Observe decade resistor reading.	Total resistance shall not exceed 600 ±60 ohms.
3	Same as step No. 1 .....		Repeat steps No. 1 and 2 at terminals 8 and 9, 11 and 12, and 14 and 15 of TB1 and TB2. Keep all unused terminals terminated as shown in figure 7-4.	Total resistance shall not exceed 135 ±13.5 ohms.
4	Same as step No. 1 .....		Repeat steps No. 1 and 2 at terminals 8 and 9, 11 and 12, and 14 and 15 of TB1 and TB2. Keep all unused terminals terminated as shown in figure 7-4.	Total resistance shall not exceed 135 ±13.5 ohms.

**7-14. Longitudinal Unbalance Test***a. Test Equipment and Materials.*

- (1) Ac Voltmeter ME-318/U.
- (2) Resistor, 300 ohms, 1/2 watt, 1/4 percent required).

(3) Resistor, 675 ohms, 1/2 watt, 1/4 percent required).

(4) Resistor, 150 ohms, 1/2 watt, 5 percent.

(5) Resistor, 33 ohms, 1/2 watt, 5 percent.

(6) Test cable Pomona AL-C-BNC-24.

*b. Test Connections and Conditions.* Connect test equipment in accordance with figure 7-4.

*c. Procedure.*

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
1	Ac Voltmeter ME-318/U: RANGE: -30DB		Record reading on ac voltmeter with voltmeter connected across R3.	0 ±0.5 dbm.
2	Ac Voltmeter ME-318/U: RANGE: -10DB.		Disconnect voltmeter from across R3 and connect across terminals 2 and 3 on TB1.	Ac voltmeter indication should be +20 dbm more than that in step No. 1.
3	Same as step No. 1 .....		Remove resistor network from terminals 2 and 3 and connect to terminals 5 and 6 on TB1.	None.
4	Same as step No. 2 .....		Repeat steps No. 1 and 2 at terminals 5 and 6 on TB1.	Same indication as step No. 2.
5	Same as step No. 1 .....		Repeat steps No. 1 through 4 for terminals 2 and 3 and 5 and 6 on TB2.	Same as step No. 2.
6	Same as step No. 1 .....		Repeat procedure provided in steps No. 1 through 5 for all remaining output terminals on TB1 and TB2, using resistor values specified in chart in figure 7-4.	Same as step No. 2.

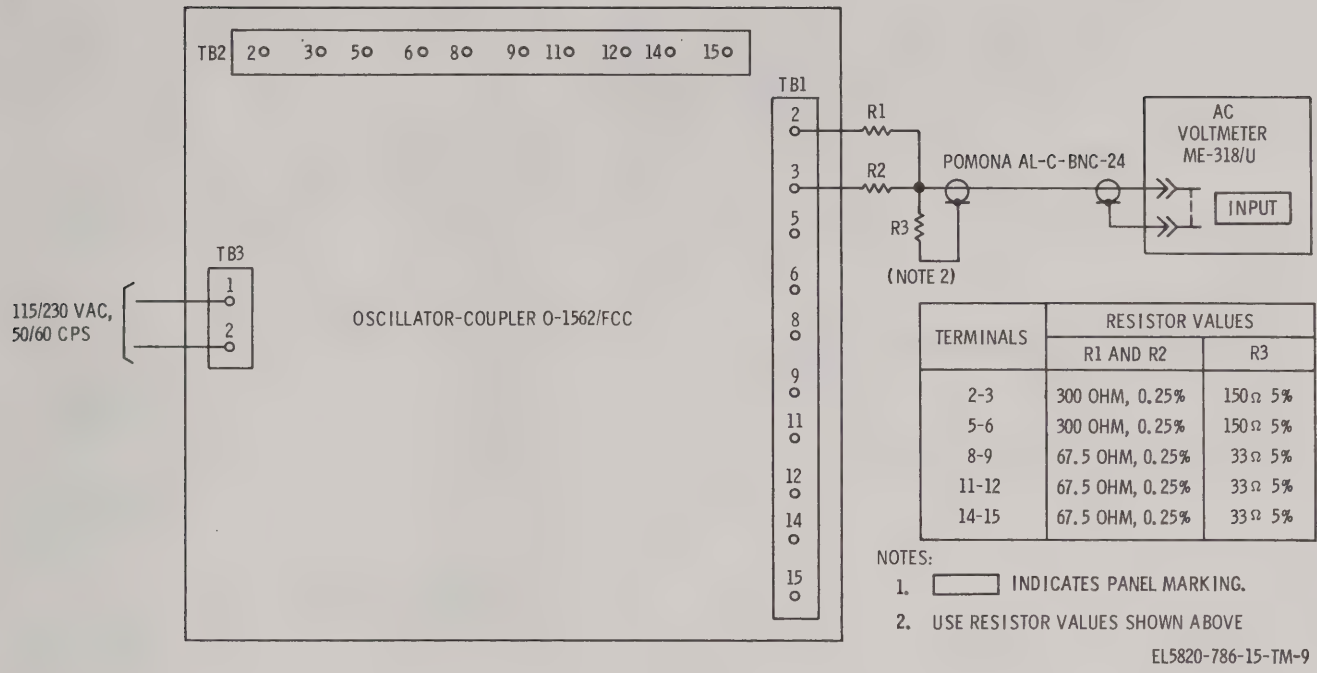


Figure 7-4. Longitudinal unbalance test setup.

7-15. Input Power Variation Test

a. Test Equipment and Materials.

- (1) Ac Voltmeter ME-318/U.
- (2) Frequency Counter CP-772/U.
- (3) Test cable, Pomona AL-C-BNC-24.
- (4) Test cable HP-11086A.
- (5) Adapter UG-274/U.
- (6) Resistor, 604 ohms, 1/2 watt, 1 percent (as required).

c. Procedure.

(7) Resistor, 133 ohms, 1/2 watt, 1 percent (as required).

(8) Variac, GR W10MT3A.

b. Test Connections and Conditions.

- (1) Connect test equipment in accordance with figure 7-5.
- (2) Terminate all unused output terminals on TB1 and TB2 using resistor values shown for applicable terminals.

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
1	Ac Voltmeter ME-318/U: RANGE: +10 db Frequency Counter CP-772/U: SENSITIVITY (VOLTS RMS): 10 TIME BASE: 0.1 FUNCTION: FREQUENCY		Adjust variac to supply 115-volt ac input voltage to oscillator-coupler. Record ac voltmeter and frequency counter indications.	-10 $\pm$ 0.5 dbm (meter reads 0 db), 4 kc $\pm$ 0.1 cps.
2	Same as step No. 1		Reduce input voltage from 115 volts ac to 103.5 volts ac.	Ac voltmeter indication does not change more than 1 percent. Frequency counter does not change more than $\pm$ 1 count.
3	Same as step No. 1		Increase input voltage from 103.5 volts ac to 126.5 volts ac.	Same indication as step No. 2.

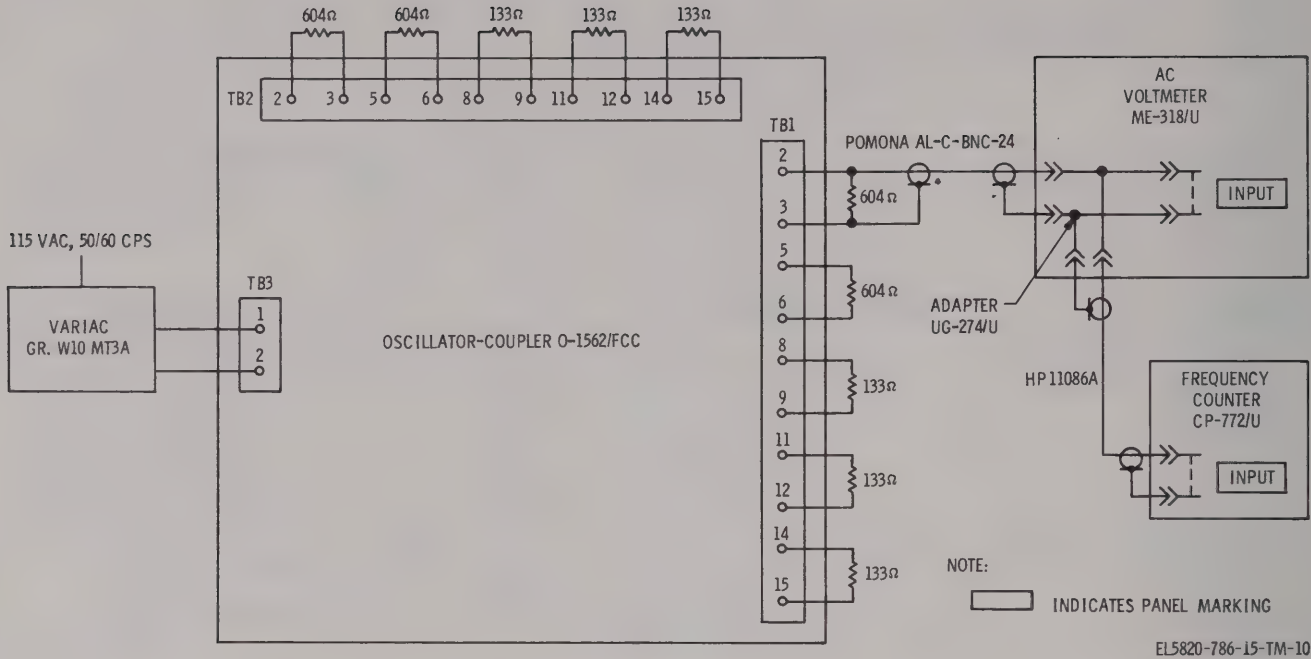


Figure 7-5. Input power variation test setup.

7-16. Frequency Accuracy and Stability Test

- a. Test Equipment and Materials.
- (1) V1F comparator HP-117A.
  - (2) Frequency converter NS-70-2A.
  - (3) Test cable, RG-274 with BNC male connector at one end and Amphenol 27-1 connector at other end (length determined by station requirements).
- c. Procedure.

tor at other end (length determined by station requirements).

b. Test Connections and Conditions.

- (1) Connect the test equipment in accordance with figure 7-6.
- (2) Turn on the test equipment and allow a minimum of 10 minutes for warmup and stabilization.

Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
1	HP 117A: METER FUNCTION: PHASE COMPARI- SON.		<p>a. Connect test equipment as shown in figure 7-6.</p> <p>b. Tune the VLF comparator to the 60-kc VLF station at Rugby, Great Britain.</p> <p>c. Observe the frequency offset and drift rate on the comparator recorder for an 8-hour period. Determine frequency offset and drift rate using template provided with the comparator.</p>	<p>a. None.</p> <p>b. None.</p> <p>c. Frequency offset shall not exceed 4 parts in <math>10^7</math>, and drift rate shall not exceed 3 parts in <math>10^6</math> for a 24-hour period.</p>

NOTE

If the offset exceeds 1 part in  $10^6$ , use the dot spacing to determine offset.



Step No.	Control settings Test equipment	Equipment under test	Test procedure	Performance standard
2	Same as step No. 1		If offset exceeds 4 parts in $10^7$ , adjust frequency adjust control on oscillator can for an offset that does not exceed 5 parts in $10^9$ . Monitor oscillator frequency for a 24-hour period.	Offset shall not exceed 5 parts in $10^9$ .
3	Same as step No. 1		Interchange oscillator assemblies Y1 and Y2, and repeat steps No. 1 and 2.	Same indication as steps No. 1 and 2.

## 7-17. Summary of Output Frequencies and Levels

A summary of output frequencies and levels provided by the oscillator-coupler is provided in the chart below:

Terminal	Frequency	Level
TB1-2, -3	4 kc $\pm 0.1$ cps	-10 $\pm 0.5$ dbm
TB1-5, -6	8 kc $\pm 0.1$ cps	-10 $\pm 0.5$ dbm
TB1-8, -9	60 kc $\pm 0.1$ cps	-16.5 $\pm 0.5$ db
TB1-11, -12	96 kc $\pm 0.1$ cps	-16.5 $\pm 0.5$ db
TB1-14, -15	128 kc $\pm 0.1$ cps	-16.5 $\pm 0.5$ db
TB2-2, -3	4 kc $\pm 0.1$ cps	-10 $\pm 0.5$ dbm
TB2-5, -6	8 kc $\pm 0.1$ cps	-10 $\pm 0.5$ dbm
TB2-8, -9	60 kc $\pm 0.1$ cps	-16.5 $\pm 0.5$ db
TB2-11, -12	96 kc $\pm 0.1$ cps	-16.5 $\pm 0.5$ db
TB2-14, -15	128 kc $\pm 0.1$ cps	-16.5 $\pm 0.5$ db

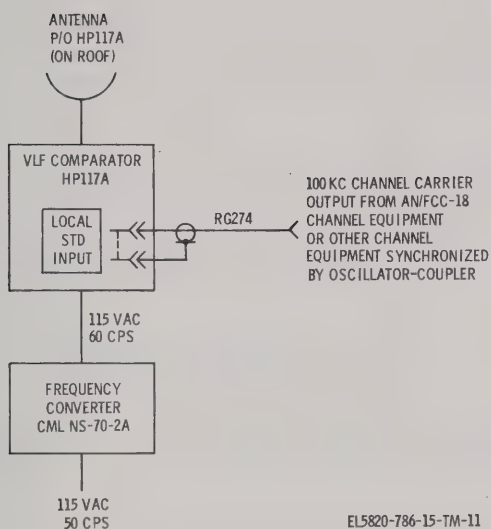


Figure 7-6. Frequency accuracy and stability test setup.



## CHAPTER 8

### DEPOT MAINTENANCE

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#### 8-1. General

##### NOTE

Any circuit card assembly, oscillator, or power supply returned to the depot maintenance area for repair, or found to be defective as a result of depot maintenance should be forwarded to the manufacturer for repair as indicated in SB 11-497.

Depot maintenance responsibilities include repairing, overhauling, and testing the oscillator-coupler, using the procedures provided in the direct support maintenance chapter.

#### 8-2. Tools, Test Equipment, and Materials Required

Refer to the list of tools, test equipment, and materials listed in the direct support maintenance chapter.

#### 8-3. Depot Maintenance Troubleshooting

Refer to the troubleshooting procedures provided in chapter 7.

#### 8-4. Adjustment, Removal, and Replacement

Refer to chapter 7 for all adjustment, removal, and replacement procedures.

#### 8-5. Depot Overhaul Standards

*a. General.* The tests outlined in this chapter are designed to measure the overall performance capability of a repaired equipment. Equipment that is returned to stock should meet the standards given in the procedures.

*b. Depot Overhaul.* To perform the depot overhaul standard tests, perform the tests provided in the chart below:

<i>Performance test</i>	<i>Paragraph</i>
Output level and frequency .....	7-10
Changeover system .....	7-11
Output circuit isolation .....	7-12
Output impedance .....	7-13
Longitudinal unbalance .....	7-14
Input power variation .....	7-15
Frequency accuracy and stability .....	7-16

*Figure 8-1. Color code marking for MIL-STD resistors, capacitors, and inductors.  
(Located in back of manual.)*





## APPENDIX A

### REFERENCES

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The following publications contain information applicable to the operation and maintenance of the oscillator-coupler :

AR 310-25	Dictionary of United States Army Terms.
DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Supply Manuals (types 7, 8, and 9), and Lubrication Orders.
DA Pam 310-7	U.S. Army Equipment Index of Modification Work Orders.
SB 11-497	Electornic Items, Depot Category Maintenance Support.
SB 11-573	Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies and Equipment Used by the Army.
SC 5180-91-CL-R07	Tool Kit, Electronic Equipment TK-105/G.
TB 746-10	Field Instructions for Painting and Preserving Electronics Command Equipment.
TB SIG 355-1	Depot Inspection Standard for Repaired Signal Equipment.
TB SIG 355-2	Depot Inspection Standard for Refinishing Repaired Signal Equipment.
TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TM 9-213	Painting Instructions for Field Use.
TM 38-750	Army Equipment Record Procedures.





## APPENDIX C

### MAINTENANCE ALLOCATION

---

#### Section I. INTRODUCTION

##### C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for O-1562/FCC. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

##### C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

*a. Inspect.* To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

*b. Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

*c. Service.* To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

*d. Adjust.* To rectify to the extent necessary to bring into proper operating range.

*e. Align.* To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

*f. Calibrate.* To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists

of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

*g. Install.* To set up for use in an operational environment such as an encampment, site, or vehicle.

*h. Replace.* To replace unserviceable items with serviceable like items.

*i. Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

*j. Overhaul.* Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

*k. Rebuild.* The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

*l. Symbols.* The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

**C-3. Explanation of Format**

*a. Column 1, Group Number.* Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

*b. Column 2, Functional Group.* Column 2 lists the noun names of components, assemblies, subassemblies and modules on which maintenance is authorized.

*c. Column 3, Maintenance Functions.* Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

<i>Code</i>	<i>Maintenance Category</i>
C -----	Operator/crew
O -----	Organizational maintenance
F -----	Direct support maintenance
H -----	General support maintenance
D -----	Depot maintenance

*d. Column 4, Tools and Test Equipment.* Column 4 specifies, by code, those tools and test equipment required to perform the designated

function. The numbers appearing in this column refer to specific tools and test equipment which are identified in section III.

*e. Column 5, Remarks.* Self-explanatory.

**C-4. Explanation of Format of Section III, Tool and Test Equipment Requirements**

The columns in Section III, Tool and Test Equipment Requirements, are as follows:

*a. Tools and Equipment.* The numbers in this column coincide with the numbers used in the tools and equipment column of the Maintenance Allocation Chart. The numbers indicate the applicable tool for the maintenance function.

*b. Maintenance Category.* The codes in this column indicate the maintenance category normally allocated the facility.

*c. Nomenclature.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

*d. Federal Stock Number.* This column lists the Federal stock number of the specific tool or test equipment.

*e. Tool Number.* Not used.

Nomenclature of End Item or Component    Oscillator-Coupler O-1562/FCC														
Group Number a	Component Assembly Nomenclature b	Maintenance Function c										Tools and Equipment d	Remarks e	
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul			Rebuild
1	Oscillator-Coupler O-1562/FCC	0											18	Note: Return all defective cards, oscillators, and power supplies to Pirmasens for repair per SB11-497
			0										1	Lamp check and continuity
			F										2,6,7,8,9,11,12,13	
				0									18	Clean
									F				18	Replace lamps
										0			18	
										F			18	
											D		1 thru 18	
													18	
A5	Circuit Card Assembly, 60 KHz Divider	0											2,3,10,12,13,14,15,16,17,18	Changeover, output impedance,output circuit isolation and longitudinal unbalance



## Nomenclature of End Item or Component Oscillator-Coupler O-1562/FCC (Cont.)

Group Number a	Component Assembly Nomenclature b	Maintenance Function c										Tools and Equipment d	Remarks e
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	
A5 (Cont.)	Circuit Card Assembly, 60 KHz Divider				F								Output level adjustment and check frequency
									0			18	Based on built-in status lamps
A7	Circuit Card Assembly, 96 KHz Divider 300312								F			18	Same as A5 of group number 1
A3	Circuit Card Assembly, 8 KHz Divider 300313												Same as A5 of group number 1
A1	Circuit Card Assembly, 4 KHz Divider 300314												Same as A5 of group number 1
A9	Circuit Card Assembly, 128 KHz Divider 300310												Same as A5 of group number 1
A14	Circuit Card Assembly, Combine and Driver 300315-1	0										18	Changeover test
			F									2,11,18	
												2,11,18	

## Nomenclature of End Item or Component Oscillator-Coupler O-1562/FCC (Cont.)

Group Number a	Component Assembly Nomenclature b	Maintenance Function c										Tools and Equipment d	Remarks e
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul	Rebuild	
A14 (Cont.)	Circuit Card Assembly, Combine and Driver 300315-1								0			18	Based on built-in status lamps
A13	Circuit Card Assembly, Combine and Driver 300315-2								F			18	Same as A14 of group number 1
PS1, PS2	Power Supply, 300307	0			F							18	Output voltage
									0			1, 18	Based on built-in status lamp
									F			18	Frequency accuracy and stability and adjustment, as required
Y1	Crystal, Oscillator 300306	0	F									18	
												4,5,18	

Nomenclature of End Item or Component    Oscillator-Coupler O-1562/FCC (Cont.)													
Group Number a	Component Assembly Nomenclature b	Maintenance Function c										Tools and Equipment d	Remarks e
		Inspect	Test	Service	Adjust	Align	Calibrate	Install	Replace	Repair	Overhaul		
Y1 (Cont.)	Crystal, Oscillator 300306								0			18	Based on built-in status lamps
									F			18	



## Nomenclature of End Item or Component Oscillator-Coupler O-1562/FCC

Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
1	F,D	Multimeter, AN/USM-210	6625-019-0815	
2	F,D	AC VTVM, ME-318/U	6625-727-4706	
3	F,D	Resistance Decade, GR1434G	6625-067-9025	
4	F,D	VLF Receiver, HP 117A	6625-902-7571	
5	F,D	Frequency Converter, CML NS-70-2A or equivalent		
6	F,D	Variac GR W10 MT3A	6120-054-7794	
7	F,D	Frequency Counter CP-772/U or AN/USM-207	6625-973-4837	
8	F,D	BNC - Tee, UG-274		
9	F,D	Test Cable, HP11086A		
10	F,D	Test Cable, Pomona 28C-AL-24		
11	F,D	Test Cable, Pomona AL-C-BNC-24 (2 required)		
12	F,D	Resistor, 133 Ohm, 1/2w, 1%, RN65D1330F (6 required)		
13	F,D	Resistor, 604 Ohm, 1/2w, 1%, RN65D6040F (4 required)		
14	F,D	Resistor, 300 Ohm, 1/2w, 1/4%, RN65F3000C (2 required)		
15	F,D	Resistor, 150 Ohm, 1/2w, 5%, RC20GFI51J		
16	F,D	Resistor, 67.5 Ohm, 1/2w, 1/4%, RN65F67R5F (2 required)		

Nomenclature of End Item or Component Oscillator-Coupler O-1562/FCC (Cont.)				
Tool or Test Equipment Reference Code	Maintenance Category	Nomenclature	FSN	Tool Number
17	F, D	Resistor, 33 Ohm, 1/2w, 5%, RC20GF330J	5180-610-8177	
18	O, F, D	Tool Kit, Electronic Equipment, TK-105/G		

APPENDIX D  
ORGANIZATIONAL, DS, GS, AND DEPOT MAINTENANCE  
REPAIR PARTS AND SPECIAL TOOLS LIST

---

Section I. INTRODUCTION

D-1. Scope.

This appendix contains a list of repair parts required for the performance of organizational maintenance and a list covering the corresponding requirements for direct support, general support and depot maintenance for Oscillator-Coupler, O-1562/FCC. This appendix is current as of 13 April 1971.

NOTE: No special tools, test, and support equipment are required.

D-2. General.

The repair parts list is divided into the following sections:

a. Prescribed Load Allowance List - Section II. A consolidated listing of repair parts quantitatively allocated for initial stockage at organizational maintenance category. This is a mandatory minimum stockage allowance.

b. Repair Parts for Organizational Maintenance - Section III. A list of repair parts authorized for the performance of maintenance at the organizational level.

c. Repair Parts for Direct Support, General Support and Depot Maintenance - Section IV. A list of repair parts authorized for the performance of maintenance at the direct support, general support and depot maintenance levels.

d. Federal Stock Number Index - Section V. An index of FSN's to illustrations by figure and item number/reference symbol.

D-3. Explanation of Columns.

An explanation of the columns in Sections II through IV is given below:

a. Source, Maintenance, and Recoverability Codes, Column 1, Sections III and IV.



- (1) Source code, column 1a. The selection status and source for the listed item is shown in the column. Source codes and their explanations are as follows:

<u>Code</u>	<u>Explanation</u>
P --	applies to repair parts which are stocked in or supplied from the GSA/DSA, or Army Supply System, and authorized for use at indicated maintenance categories.
M --	applies to repair parts which are not procured or stocked but are to be manufactured at indicated maintenance categories.
A --	applies to assemblies which are not procured or stocked as such but are made up of two or more units, each of which carry individual stock numbers and descriptions and are procured and stocked and can be assembled by units at indicated maintenance categories.
X1 --	applies to repair parts which are not procured or stocked. The requirement for which will be supplied by use of next higher assembly or component.
X2 --	applies to repair parts which are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain such parts through cannibalization. If they are not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

- (2) Maintenance code, column 1b. The lowest category of maintenance authorized to install the listed item is indicated in this column.

<u>Code</u>	<u>Explanation</u>
O --	Organization Maintenance
F --	Direct Support Maintenance
D --	Depot Support Maintenance

- (3) Recoverability code, column 1c. The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability codes are:

<u>Code</u>	<u>Explanation</u>
R --	applies to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis.
T --	applies to high dollar value recoverable repair parts which are subject to special handling and are issued on an exchange basis. Such repair parts normally are repaired or overhauled at depot maintenance activities.

NOTE: When there is no code indicated in the recoverability column, the part will be considered expendable.

b. Federal Stock Number, Column 1, Section II; Column 2, Sections III and IV. The Federal stock number for the item is indicated in this column.

c. Description, Column 2, Section II; Column 3, Sections III and IV. A sequence number, Federal item name, a five-digit manufacturer's code, an indenture code, and a part number are included in this column. For subsequent appearances of the same item, the manufacturer's code and part number are omitted. The words "same as" followed by the sequence number assigned to the item when it first appeared in the list will follow the item, e.g. "RESISTOR, FIXED, COMPOSITION: SAME AS A298". The indenture codes indicate the end item, the assemblies, and the component parts. Identical codes are parts of the preceding higher code. An asterisk (\*) indicates attaching hardware.

d. Unit of Issue, Column 4, Sections III and IV. The unit used as a basis of issue (e.g., ea., pr., ft., yd., etc.), is noted in this column.

e. Quantity Incorporated in Unit Pack, Column 4, Section II; Column 5, Sections III and IV. Not used.

f. Quantity Incorporated in Unit, Column 6, Sections III and IV. The quantity of repair part in an assembly is indicated in this column. Subsequent appearance of the same item in the same assembly are indicated by the letters, "REF".

g. Maintenance Allowance, Column 3, Section II; Column 7, Sections III and IV.

- (1) The allowance columns are divided into subcolumns. The total quantity of items authorized for the number of equipments supported is indicated in each subcolumn opposite the first appearance of each item. Subsequent appearances of the same

item will have no entry in the allowance columns but will have a reference, in the description column, to the first appearance of the item. Items authorized for use as required but not for initial stockage are identified with an asterisk (\*) in the allowance column.

- (2) The quantitative allowance for organizational category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.
- (3) Subsequent changes to organizational allowance will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendations should be forwarded to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL-ME-NMP-EM, Fort Monmouth, N.J. 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point based upon engineering experience, demand data or TAERS information.
- (4) The quantitative allowance for DS/GS categories of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

h. One-Year Allowance Per 100 Equipments/Contingency Planning Purposes, Column 8, Section IV. Opposite the first appearance of each item, the total quantity required for distribution and contingency planning purposes is indicated. The range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for one year.

i. Illustration, Column 8, Section III; Column 10, Section IV.

- (1) Figure number, column 8a and 10a. The number of the illustration in which the item is shown, is indicated in this column.
- (2) Item or symbol number, column 8b and 10b. The callout number used to reference the item in the illustration is indicated in this column.

j. Depot Maintenance Allowance Per 100 Equipments, Column 9, Section IV. This column indicates the total quantity of each item authorized depot maintenance for 100 equipments. Subsequent appearances of the same item will have no entry in this column, but will have a reference in the description column to the first appearance of the item.



#### D-4. Location of Repair Parts.

a. When the Federal stock number is unknown, follow the procedures given in (1) through (3) below.

- (1) If the item or symbol number is available, locate the item by scrutiny of columns 8b and/or 10b of the repair parts list.
- (2) If the item, symbol, and figure number is not known, check the description column, (column 3), in the repair parts list to locate the item.
- (3) Locate the applicable illustration in this manual and note the figure and item number. Use the repair parts listing and locate the figure number and item number as noted on the illustration.

b. When the Federal stock number is known, use the Index of Federal stock numbers to figure and item numbers and locate the Federal stock number. The Federal stock numbers are listed in numerical sequence and are cross referenced to the figure number and item number.

#### D-5. Federal Supply Codes.

This paragraph list the Federal supply code and the associated manufacturer's name.

<u>Code</u>	<u>Manufacturer</u>
00348	Microtran Co., Inc., Valley Stream, N.Y.
04713	Motorola Inc., Semiconductor Products Div., Phoenix, Arizona
05236	Jonathan Mfg. Co., Fullerton, Calif.
05574	Viking Industries Inc., Chatsworth, Calif.
07047	Ross Milton Co., Southampton, Pa.
14195	Electronic Controls Inc., Wilton, Conn.
30010	Vero Electronics Inc., Farmingdale, N.Y.
30212	Holobeam Inc., Paramus, N.J.
56289	Sprague Electronic Co., North Adams, Mass.
71400	Bussman Mfg. Div. of McGraw Edison Co., St. Louis, Mo.
71785	Cinch Mfg. Co. and Howard B. Jones Div., Chicago, Ill.
75382	Kulka Electronic Corp., Mt. Vernon, N.Y.

<u>Code</u>	<u>Manufacturer</u>
76493	Miller, J.W. Co., Los Angeles, Calif.
80131	Electronic Industries Association, Washington, D.C.
80294	Bourns Inc., Riverside, Calif.
81349	Military Specifications Promulgated by Standardization Div. Directorate of Logistic Services DSA
86684	Radio Corp. of America, Harrison, N.J.
96182	Master Specialties Co., Costa Mesa, Calif.
96906	Military Standard Promulgated by Standardization Div. Directorate of Logistic Services DSA

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION	(3) 15-DAY ORG. MAINT. ALLOWANCE				(4) QTY INC IN UN PK
		(A)	(B)	(C)	(D)	
		1-5	6-20	21-50	51-100	
5820-477-3830	G065 CIRCUIT CARD ASSEMBLY, 8KHZ DIVIDER: 30212; 300313			2	2	
5820-477-3835	G196 CIRCUIT CARD ASSEMBLY, 128KHZ DIVIDER: 30212; 300310			2	2	
5820-477-3836	G110 CIRCUIT CARD ASSEMBLY, 60KHZ DIVIDER: 30212; 300311			2	2	
5820-477-3837	G154 CIRCUIT CARD ASSEMBLY, 96KHZ DIVIDER: 30212; 300312			2	2	
5820-477-3839	G018 CIRCUIT CARD ASSEMBLY, 4KHZ DIVIDER: 30212; 300314			2	2	
5820-477-3841	G237 CIRCUIT CARD ASSEMBLY, COMBINER AND DIVIDER: 30212; 300315-1		2	2	3	
5820-477-3842	G297 CIRCUIT CARD ASSEMBLY, COMBINER AND DIVIDER: 30212; 300315-2		2	2	3	
5920-295-7013	G376 FUSE, CARTRIDGE: 71400; GLD2	2	4	11	20	
5955-483-0486	G374 CRYSTAL, OSCILLATOR: 30212; 300306			2	2	
6210-226-4542	G417 INDICATOR, LIGHT: 96906; MS25446-4			2	2	
6240-456-6099	G461 LIGHT, INDICATOR: 96182; 12K	2	2	4	8	

## REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE

TM 11-5820-786-15

REPAIR PARTS FOR ORGANIZATIONAL MAINTENANCE													TM 11-5820-786-15	
SOURCE CD	(1) MAINT. CD	REC. CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF ISSUE	(5) QTY INC IN UN PK	(6) QTY INC IN UN UNIT	(7) 15 DAY ORG. MAINT. ALW.				(8) ILLUSTRATIONS		
								(A) 1-5	(B) 6-20	(C) 21-50	(D) 51-100	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER	
P	O	T	5805-760-6072	G001 OSCILLATOR-COUPER O-1562/FCC: 30212; 300302	ea							1-1		
P	O	T	5820-477-3839	G018 CIRCUIT CARD ASSEMBLY, 4KHZ DIVIDER: 30212; 300314	ea	2	*	*	2	2		1-3	A1, A2	
P	O	T	5820-477-3830	G065 CIRCUIT CARD ASSEMBLY, 8KHZ DIVIDER: 30212; 300313	ea	2	*	*	2	2		1-3	A3, A4	
P	O	T	5820-477-3836	G110 CIRCUIT CARD ASSEMBLY, 60KHZ DIVIDER: 30212; 300311	ea	2	*	*	2	2		1-3	A5, A6	
P	O	T	5820-477-3837	G154 CIRCUIT CARD ASSEMBLY, 96KHZ DIVIDER: 30212; 300312	ea	2	*	*	2	2		1-3	A7, A8	
P	O	T	5820-477-3835	G196 CIRCUIT CARD ASSEMBLY, 128KHZ DIVIDER: 30212; 300310	ea	2	*	*	2	2		1-3	A9, A10	
P	O	T	5820-477-3841	G237 CIRCUIT CARD ASSEMBLY, COMBINER AND DIVIDER: 30212; 300315-1	ea	1	*	2	2	3		1-3	A14	
P	O	T	5820-477-3842	G297 CIRCUIT CARD ASSEMBLY, COMBINER AND DIVIDER: 30212; 300315-2	ea	1	*	2	2	3		1-3	A13	
P	O		5955-483-0486	G374 CRYSTAL, OSCILLATOR: 30212; 300306	ea	2	*	*	2	2		1-3	Y1, Y2	
P	O		5920-295-7013	G376 FUSE, CARTRIDGE: 71400; GLD2	ea	4	2	4	11	20		1-1	F1 thru F4	
P	O		6210-226-4542	G417 INDICATOR, LIGHT: 96906; MS25446-4	ea	14	*	*	2	2		1-1	DS1 thru DS14	
P	O		6210-064-2998	G431 INDICATOR, LIGHT: 96906; MS25446-5	ea	2	*	*	*	*		1-1	DS23, DS24	
P	O		6240-456-6099	G461 LIGHT, INDICATOR: 96182; 12K	ea	8	2	2	4	8		1-1	DS15 thru DS22	
P	O		6130-401-1540	G478 POWER SUPPLY: 30212; 300307	ea	2	*	*	*	*		1-3	PS1, PS2	



SECTION IV DEBAR PARTS FOR DIRECT SUPPORT GENERAL SUPPORT, AND DEPOT MAINTENANCE

[illegible]

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE													ILLUSTRATIONS										TM 11-5820-786-1-5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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(A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	FEDERAL STOCK NUMBER	DESCRIPTION						UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.						(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
				1	2	3	4	5	6				DS	GS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE																													
(1)		(2)		(3)										(4)	(5)	(6)	(7)					(8)	(9)	(10)					
SOURCE CD	(A)	(B)	(C)	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.					(B) PER 100 EQUIP. CNTRY PL.	(8) 1 YR. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER						
					1			2							DS	GS													
					1	2	3	4	5	6							(A)	(B)	(C)					(A)	(B)	(C)			
X1	D			5905-723-5251						C	G055 RESISTOR, FIXED, COMPOSITION: 81349; RC07GF222J	ea		4														R17 thru R20	
X1	D									C	G059 RESISTOR, VARIABLE: 80294; 3052P1-500	ea		1														R4	
X1	D			5961-938-1138						C	G060 SEMICONDUCTOR DEVICE, DIODE: 80131; 1N4148	ea		4														CR1 thru CR4	
X1	D									C	G064 TRANSFORMER, AUDIO FREQUENCY: 00348; PM35M	ea		1														T1	
P	O	T		5820-477-3830						B	G065 CIRCUIT CARD ASSEMBLY, 8KHZ DIVIDER: 30212; 300313	ea		2	2	3	5	*	*	2	13	6					1-3	A3, A4	
X1	D									C	G067 AMPLIFIER, INTEGRATED CIRCUIT: SAME AS G020	ea		1														ARI	
X1	D			5910-043-1405						C	G068 CAPACITOR, FIXED, CERAMIC DIELECTRIC: 81349; CK15BR224K	ea		1														C2	
X1	D			5910-809-8667						C	G069 CAPACITOR, FIXED, ELECTROLYTIC: SAME AS G022	ea		5														C1, C3, C4, C5, C6	
X1	D									C	G074 COIL, RADIO FREQUENCY: 76493; 9240-749	ea		2														L1, L2	
X1	D									C	G076 INTEGRATED CIRCUIT, DUAL FLIP FLOP: SAME AS G029	ea		4														U4, U5, U7, U8	
X1	D			5962-103-4462						C	G080 INTEGRATED CIRCUIT, DUAL NAND GATE: SAME AS G033	ea		2														U1, U2	
X1	D			5962-106-6645						C	G082 INTEGRATED CIRCUIT, FLIP FLOP: SAME AS G035	ea		2														U6, U10	

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)									
(1)	(2)	(3)	(4)	(5)	(6)	(7)						(8)	(9)	(10)					
(A)	(B)	(C)	(D)	(E)	(F)	(G)						(H)	(I)	(J)	(K)				
SOURCE CD	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.						PER 100 EQUIP.	DEPOT MAINT. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER				
						(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)				
X1 D	5962-066-0171	G084 INTEGRATED CIRCUIT, QUAD NAND GATE: SAME AS G038	ea	1	1	1-20	21-50	51-100							U3				
X1 D	5905-681-6462	G085 PRINTED CIRCUIT BOARD: 30212; 300334-3	ea	1	1	1-20	21-50	51-100							E27				
X1 D	5905-279-1879	G086 RESISTOR, FIXED, COMPOSITION: SAME AS G040	ea	5	5	1-20	21-50	51-100							R1, R2, R12, R14, R16				
X1 D	5905-190-8889	G091 RESISTOR, FIXED, COMPOSITION: SAME AS G045	ea	1	1	1-20	21-50	51-100							R3				
X1 D	5905-683-7723	G092 RESISTOR, FIXED, COMPOSITION: SAME AS G046	ea	1	1	1-20	21-50	51-100							R5				
X1 D	5905-686-9996	G093 RESISTOR, FIXED, COMPOSITION: SAME AS G047	ea	4	4	1-20	21-50	51-100							R6 thru R9				
X1 D	5905-683-2240	G097 RESISTOR, FIXED, COMPOSITION: SAME AS G051	ea	2	2	1-20	21-50	51-100							R10, R13				
X1 D	5905-817-7971	G099 RESISTOR, FIXED, COMPOSITION: SAME AS G053	ea	1	1	1-20	21-50	51-100							R11				
X1 D	5905-723-5251	G100 RESISTOR, FIXED, COMPOSITION: SAME AS G054	ea	1	1	1-20	21-50	51-100							R15				
X1 D	5961-938-1138	G101 RESISTOR, FIXED, COMPOSITION: SAME AS G055	ea	3	3	1-20	21-50	51-100							R17, R18, R20				
X1 D		G104 RESISTOR, VARIABLE: SAME AS G059	ea	1	1	1-20	21-50	51-100							R4				
X1 D		G105 SEMICONDUCTOR DEVICE, DIODE: SAME AS G060	ea	4	4	1-20	21-50	51-100							CR1 thru CR4				



## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE												(1)		(2)		(3)						(4)		(5)						(6)						(7)						(8)		(9)		(10)	
(A)		(B)		(C)		FEDERAL STOCK NUMBER		DESCRIPTION						UNIT OF ISSUE		QTY INC IN UN PK		QTY INC IN UN		30 DAY MAINT. ALW.						PER 100 EQUIP. ALW. PER 1 YR. ALW. PER 100 EQUIP. ALW																					

TM 11-5820-786-15

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										ILLUSTRATIONS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
(1)		(2)		(3)						(4)		(5)		(6)		(7)						(8)		(9)		(10)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
(A)	(B)	SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN	30 DAY MAINT. ALW.	DS						PER 100 EQUIP. CNGCY PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	(A)	(B)	FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
						1	2	3	4	5	6						7	8	9	10	11	12							13	14	15	16	17	18	19	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
X1	D				5905-681-6462							C	G129 RESISTOR, FIXED, COMPOSITION: SAME AS G040	ea																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										(10) ILLUSTRATIONS																
(1)	(2)	(3) DESCRIPTION						(4)	(5)	(6)	(7) 30 DAY MAINT. ALW.			(8)	(9)	(A) FIGURE NUMBER		(B) ITEM OR SYMBOL NUMBER								
(A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	FEDERAL STOCK NUMBER	MODEL						UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	DS			GS			1 YR. ALW. PER 100 EQUIP. CNFGY PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	(A)	(B)				
				1	2	3	4	5	6	IND CD				(A)	(B)	(C)	(A)	(B)	(C)							
X1	D									C	G156 AMPLIFIER, INTEGRATED CIRCUIT: SAME AS G020	ea					1-20	21-50	51-100					AR1		
X1	D		5910-105-7640							C	G157 CAPACITOR, FIXED, CERAMIC, DIELECTRIC: SAME AS G116	ea													C1, C5	
X1	D		5910-043-1404							C	G159 CAPACITOR, FIXED, CERAMIC, DIELECTRIC: 81349; CK14BX33K	ea													C2	
X1	D		5910-809-8667							C	G160 CAPACITOR, FIXED, ELECTROLYTIC: SAME AS G022	ea													C3, C4, C6	
X1	D									C	G163 COIL, RADIO FREQUENCY: 76493; 9240-735	ea													L1, L2	
X1	D									C	G165 INTEGRATED CIRCUIT, DUAL FLIP FLOP: SAME AS G029	ea													U4, U5	
X1	D		5962-103-4462							C	G167 INTEGRATED CIRCUIT, DUAL NAND GATE: SAME AS G033	ea													U1, U2	
X1	D		5962-106-6645							C	G169 INTEGRATED CIRCUIT, FLIP FLOP: SAME AS G035	ea													U6, U10	
X1	D		5962-066-0171							C	G171 INTEGRATED CIRCUIT, QUAD NAND GATE: SAME AS G038	ea													U3	
X1	D									C	G172 PRINTED CIRCUIT BOARD: 30212; 300334-7	ea													E28	
X1	D		5905-681-6462							C	G173 RESISTOR, FIXED, COMPOSITION: SAME AS G040	ea													R1, R2, R12, R14, R16	
X1	D		5905-279-1879							C	G178 RESISTOR, FIXED, COMPOSITION: SAME AS G045	ea													R3	

TM 11-5820-786-15

SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE															SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)																
(1)		(2)		(3)						(4)	(5)	(6)	(7)						(8)	(9)	(10)		TM 11-5820-786-15								
(A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	FEDERAL STOCK NUMBER	DESCRIPTION						UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN PK	30 DAY MAINT. ALW.						PER 100 EQUIP. CNTRY PL. 1 YR. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER										
				MODEL									DS			GS															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
X1	D		5905-190-8889							C	G179 RESISTOR, FIXED, COMPOSITION: SAME AS G046	ea																	R5		
X1	D		5905-686-9994							C	G180 RESISTOR, FIXED, COMPOSITION: SAME AS G136	ea																	R6 thru R9		
X1	D		5905-686-9996							C	G184 RESISTOR, FIXED, COMPOSITION: SAME AS G051	ea																	R10, R13		
X1	D		5905-683-2240							C	G186 RESISTOR, FIXED, COMPOSITION: SAME AS G053	ea																	R11		
X1	D		5905-817-7971							C	G187 RESISTOR, FIXED, COMPOSITION: SAME AS G054	ea																	R15		
X1	D		5905-723-5251							C	G188 RESISTOR, FIXED, COMPOSITION: SAME AS G055	ea																	R17, R20		
X1	D									C	G190 RESISTOR, VARIABLE: SAME AS G059	ea																	R4		
X1	D		5961-938-1138							C	G191 SEMICONDUCTOR DEVICE, DIODE: SAME AS G060	ea																	CR1 thru CR4		
X1	D									C	G195 TRANSFORMER, AUDIO FREQUENCY: SAME AS G064	ea																	T1		
P	O	T	5820-477-3835							B	G196 CIRCUIT CARD ASSEMBLY, 128KHZ DIVIDER: 30212; 300310	ea																	1-3	A9, A10	
X1	D									C	G198 AMPLIFIER, INTEGRATED CIRCUIT: SAME AS G020	ea																	ARI		
X1	D		5910-105-7640							C	G199 CAPACITOR, FIXED, CERAMIC, DIELECTRIC: SAME AS G116	ea																	C1, C5		



(1)			(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(A)	(B)	(C)									
REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE								30 DAY MAINT. ALW.			ILLUSTRATIONS

TM 11-5820-786-15

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										ILLUSTRATIONS																							
(1)	(2)	(3)	(4)						(5)	(6)	(7)						(8)	(9)	(10)														
(A)	(B)	(C)	FEDERAL STOCK NUMBER	DESCRIPTION						QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.						PER 100 EQUIP. CNTRGY PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER												
				1	2	3	4	5	6			DS	GS	(A)	(B)	(C)	(A)					(B)	(C)										
X1	D		5905-686-9996							ea		2																					R10, R13
X1	D		5905-683-2240							ea		1																					R11
X1	D		5905-817-7971							ea		1																					R15
X1	D		5905-723-5251							ea		1																					R20
X1	D									ea		1																					R4
X1	D		5961-938-1138							ea		4																					CR1 thru CR4
X1	D									ea		1																					T1
P	O	T	5820-477-3841							ea		1		3	2	6	*	*	*	*													A14
X1	D									ea		3																					C1, C4, C5
X1	D		5910-105-7640							ea		2																					C2, C6
X1	D		5910-809-8667							ea		1																					C3
X1	D		5962-103-4462							ea		7																					U1, U2, U4, U5, U6, U7, U8

## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										ILLUSTRATIONS																							
(1)	(2)	(3)						(4)	(5)	(6)	(7)						(8)	(9)	(10)														
(A)	(B)	SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.						(B) PER 100 EQUIP. CNTRY PL. DEPOT MAINT. 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER									
						1	2	3	4	5	6					DS	GS			(A)	(B)				(C)	(A)	(B)	(C)					
X1	D				5962-066-0171							C	G251 INTEGRATED CIRCUIT, QUAD NAND GATE; SAME AS G038	ea		1																U3	
X1	D				5970-850-9405							C	G252 PAD, TRANSISTOR: 07047; 10001DAP	ea		4																MP16 thru MP19	
X1	D				5905-681-9969							C	G256 PRINTED CIRCUIT BOARD: 30212; 300333-1	ea		1																E30	
X1	D				5905-681-9969							C	G257 RESISTOR, FIXED, COMPOSITION: 81349; RC07GF332J	ea		6																R1, R2, R8, R20, R21, R22	
X1	D				5905-723-5251							C	G263 RESISTOR, FIXED, COMPOSITION: SAME AS G055	ea		7																R3, R4, R5, R16, R17, R31, R33	
X1	D				5905-190-8889							C	G270 RESISTOR, FIXED, COMPOSITION: SAME AS G046	ea		3																R6, R18, R29	
X1	D				5905-686-9996							C	G273 RESISTOR, FIXED, COMPOSITION: SAME AS G051	ea		2																R7, R19	
X1	D				5905-683-2243							C	G275 RESISTOR, FIXED, COMPOSITION: 81349; RC07GF151J	ea		4																R9, R11, R24, R28	
X1	D				5905-683-2238							C	G279 RESISTOR, FIXED, COMPOSITION: 81349; RC07GF103J	ea		4																R10, R12, R23, R27	
X1	D				5905-728-3544							C	G283 RESISTOR, FIXED, COMPOSITION: 81349; 239E1R05	ea		4																R13, R14, R25, R26	
X1	D				5925-683-2242							C	G287 RESISTOR, FIXED, COMPOSITION: 81349; RC07GF471J	ea		1																R30	
X1	D				5905-817-7971							C	G288 RESISTOR, FIXED, COMPOSITION: SAME AS G054	ea		1																R32	

TM 11-5820-786-15

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										TM 11-5820-786-15									
(1)	(2)	(3)	(4)	(5)	(6)	(7)						(8)	(9)	(10)					
(A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN	30 DAY MAINT. ALW.						PER 100 EQUIP. CNTGCTY PL.	1 YR. ALW. PER 100 EQUIP.	ILLUSTRATIONS			
								DS			GS					(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER		
								(A) 1-20	(B) 21-50	(C) 51-100									
X1	D		5961-938-1138	G289 SEMICONDUCTOR DEVICE, DIODE: SAME AS G060	ea		4									CR1 thru CR4			
X1	D		5961-104-8441	G293 TRANSISTOR: 80131; 2N4234	ea		4									Q1 thru Q4			
P	O	T	5820-477-3842	G297 CIRCUIT CARD ASSEMBLY, COMBINE AND DRIVER: 30212; 300315-2	ea		1	2	3	6	*	*	*	8	3	1-3			
X1	D			G298 CAPACITOR, FIXED, CERAMIC DIELECTRIC: SAME AS G238	ea		3									CI, C4, C5			
X1	D		5910-105-7640	G301 CAPACITOR, FIXED, CERAMIC DIELECTRIC: SAME AS G116	ea		2									C2, C6			
X1	D		5910-809-8667	G303 CAPACITOR, FIXED, ELECTROLYTIC: SAME AS G022	ea		1									C3			
X1	D		5962-103-4462	G304 INTEGRATED CIRCUIT, DUAL NAND GATE: SAME AS G033	ea		7									U1, U2, U4, U5, U6, U7, U8			
X1	D		5962-066-0171	G311 INTEGRATED CIRCUIT, QUAD NAND GATE: SAME AS G038	ea		1									U3			
X1	D		5970-850-9405	G312 PAD, TRANSISTOR: SAME AS G252	ea		4									MP20 thru MP24			
X1	D			G316 PRINTED CIRCUIT BOARD: 30212; 300333-2	ea		1									E31			
X1	D		5905-681-9969	G317 RESISTOR, FIXED, COMPOSITION: SAME AS G257	ea		6									R1, R2, R8, R20 R21, R22			
X1	D		5905-723-5251	G323 RESISTOR, FIXED, COMPOSITION: SAME AS G055	ea		7									R3, R4, R5, R16 R17, R31, R33			



## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (CONL.)																																		
REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE															ILLUSTRATIONS																			
(1)	(2)	(3)										(4)	(5)	(6)	(7)						(8)	(9)	(10)											
(A)	(B)	(C)	FEDERAL STOCK NUMBER		DESCRIPTION						UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.						PER 100 EQUIP. ALW. PER 1 YR. ALW. CNTRY PL. DEPOT MAINT. ALW. PER 100 EQUIP.	(A)	(B)												
SOURCE CD	MAINT. CD	REC. CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
X1	D		5905-190-8889																	ea		3												R6, R18, R29
X1	D		5905-686-9996																	ea		2												R7, R19
X1	D		5905-683-2243																	ea		4												R9, R11, R24, R28
X1	D		5905-683-2238																	ea		4												R10, R12, R23, R27
X1	D		5905-728-3544																	ea		4												R13, R14, R25, R26
X1	D		5925-683-2243																	ea		1												R30
X1	D		5905-817-7971																	ea		1												R32
X1	D		5961-938-1138																	ea		4												CR1 thru CR4
X1	D		5961-104-8441																	ea		4												Q1 thru Q4
P	F		5935-995-9553																	ea		14	*	2	2	2	2	2	2	2	2	1-4		XAL1 thru XAL4
M	D																			ea		2												MP24, MP25
X2	F		5310-722-5998																	ea		8												H4
TM 11-5820-786-15																																		

FM 11-5820-786-15

## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE															ILLUSTRATIONS										
(1)		(2)		(3)						(4)	(5)	(6)	(7)						(8)	(9)	(10)				
(A)	(B)	(C)	FEDERAL STOCK NUMBER	DESCRIPTION						UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.						(B) PER 100 EQUIP. CNTRY PL. DEPOT MAINT. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER				
				MODEL									DS		GS		(C)								
				1	2	3	4	5	6				(A)	(B)	(C)	(A)	(B)	(C)							
P	O		5955-483-0486							B	G374 CRYSTAL, OSCILLATOR: 30212; 300306	ea	2	*	2	2	2	2	33	3	1-3	Y1, Y2			
P	O		5920-295-7013							B	G376 FUSE, CARTRIDGE: 71400; GILD2	ea	4	8	20	38	11	10	10	885	75	1-1	F1 thru F4		
X2	F		5920-903-4157							B	G380 FUSEHOLDER: 71400; HLD	ea	2										XF1, XF2		
X2	F		5920-939-4637							B	G382 FUSEHOLDER: 71400; HKP	ea	2										XF3, XF4		
M	D									B	G384 GUIDE, CARD: 30010; 10233	ea	28										MP26 thru MP53		
M	D									B	G412 HANDLE: 30010; 10037	ea	1										MP54		
M	D									B	G413 HANDLE, BOW: 74156; H505	ea	2										MP55, MP56		
X2	F		5305-050-9225							*	G415 SCREW, MACHINE: 96906; MS51957-59	ea	16										H4		
X2	F		5310-933-8120							*	G416 WASHER, LOCK: 96906; MS35338-138	ea	4										H4		
P	O		6210-226-4542							B	G417 INDICATOR, LIGHT: 96906; MS25446-4	ea	14	2	2	3	2	2	2	71	12	1-1	DS1 thru DS14		
P	O		6210-064-2998							B	G431 INDICATOR, LIGHT: 96906; MS25446-5	ea	2	*	*	2	*	*	2	16	12	1-1	DS23, DS24		
X2	F									B	G433 INDICATOR UNIT: 96182; 12-22A	ea	2										S2, S3		
X2	F		5970-892-3782							B	G435 KEY, POLARIZING: 05574; 091-0024-000	ea	24										E1 thru E24		
X2	F		6210-900-9969							B	G459 LENS ASSEMBLY, FRONT: 96182; 12P	ea	2										MP57, MP58		
P	O		6240-456-6099							B	G461 LIGHT, INDICATOR 96182; 12K	ea	8	3	9	16	5	3	4	379	12	1-1	DS15 thru DS22		
M	D									B	G469 PANEL, FRONT: 30212; 300319	ea	1										MP59		

## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										ILLUSTRATIONS									
(1)	(2)	(3)	(4)	(5)	(6)	(7)						(8)	(9)	(10)					
(A) SOURCE CD	(B) MAINT. CD	(C) REC. CODE	FEDERAL STOCK NUMBER	DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.						PER 100 EQUIP. CNTNGY PL.	1 YR. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER		
								DS			GS							(A)	(B)
1	2	3	4	5	6	(A)	(B)	(C)	(A)	(B)	(C)	(A)	(B)	(C)					
X2	F		5310-934-9761	G470 NUT, PLAIN, HEXAGON: 96906; MS35649-264	ea		22									H14			
X2	F		5310-929-6395	G471 WASHER, LOCK: 96906; MS35338-136	ea		38									H14			
M	D			G472 PLATE, IDENTIFICATION: 30212; 100257	ea		1									MP60			
M	D			G473 PLATE, IDENTIFICATION: 30212; 300340	ea		1									MP60			
M	D			G474 PLATE, COVER: 30212; 300336	ea		1									MP62			
X2	F		5305-054-6650	G475 SCREW, MACHINE: 96906; MS51957-26	ea		16									H4			
X2	F		5310-722-5998	G476 WASHER, FLAT: SAME AS G373	ea		REF									H4			
X2	F		5310-929-6395	G477 WASHER, LOCK: SAME AS G471	ea		REF									H4			
P	O		6130-401-1540	G478 POWER SUPPLY: 30212; 300307	ea		2	*	*	*	*	2	2	6	1-3	PS1, PS2			
X2	F		5305-054-5647	G480 SCREW, MACHINE: SAME AS G016	ea		REF									H12			
M	D			G481 RAIL, CONNECTOR MOUNTING: 30010; 10211	ea		2									MP63, MP64			
X2	F		5305-732-9171	G483 SCREW, SELF TAPPING: 96906; MS24622-16	ea		12									H4			
X2	F		5310-929-6395	G484 WASHER, LOCK: SAME AS G471	ea		REF									H4			
M	D			G485 RAIL, GUIDE MOUNTING: 30010; 10514	ea		4									MP65 thru MP68			

TM 11-5820-786-15

## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE															ILLUSTRATIONS														
(1)		(2)		(3)						(4)		(5)		(6)		(7)						(8)		(9)		(10)			
(A)	(B)	SOURCE CD	MAINT. CD	REC. CODE	FEDERAL STOCK NUMBER	MODEL						DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UN UNIT	30 DAY MAINT. ALW.						PER 100 EQUIP. CNTRGY PL.	DEPOT MAINT. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER				
						1	2	3	4	5	6					(A)	(B)	(C)	(A)	(B)	(C)					(A)	(B)	(C)	
X2	F				5305-054-5647										REF												H8		
X2	F				5310-929-6395										REF												H8		
X2	F				5840-054-5932										2												MP69, MP70		
X2	F				5305-050-9225										REF												H12		
P	F				5935-436-8851										2												XY1, XY2		
X2	F				5310-934-9761										REF												H4		
X2	F				5305-054-6650										REF												H4		
X2	F				5310-929-6395										REF												H4		
M	D														28												MP71 thru MP98		
M	D														4												MP99 thru MP102		
P	F				5930-411-7609										1												1-3	S1	
M	D														2												TB1, TB2		
X2	F				5305-054-6654										6												H4		
M	D														1												TB3		
X2	F				5305-054-6654										REF												H2		
X2	F														1												TB4		



## SECTION IV REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE (Cont.)

REPAIR PARTS FOR DIRECT SUPPORT, GENERAL SUPPORT, AND DEPOT MAINTENANCE										(10) ILLUSTRATIONS																					
(1)		(2)		(3)										(4)		(5)		(6)		(7)						(8)		(9)		(10)	
(A)	(B)	SOURCE CD	(C)	FEDERAL STOCK NUMBER	MODEL						IND CD	DESCRIPTION	UNIT OF ISSUE	QTY INC IN UN PK	QTY INC IN UNIT	30 DAY MAINT. ALW.						(B) PER 100 EQUIP. CNTG CY PL. DEPOT MAINT. ALW. PER 100 EQUIP.	(A) FIGURE NUMBER	(B) ITEM OR SYMBOL NUMBER							
					1	2	3	4	5	6						DS	GS	(A)	(B)	(C)	(A)				(B)	(C)					
X2	F			5310-934-9761						*	G538 NUT, PLAIN, HEXAGON: SAME AS G470	ea			REF			1-20	(A)	21-50	(B)	51-100	(C)	1-20	(A)	21-50	(B)	51-100	(C)		H4
X2	F			5305-054-6650						*	G539 SCREW, MACHINE: SAME AS G475	ea			REF															H8	
X2	F			5310-929-6395						*	G540 WASHER, LOCK: SAME AS G471	ea			REF															H4	

TM 11-5820-786-15

TM 11-5820-786-15

# INDEX - FEDERAL STOCK NUMBER CROSS REFERENCE TO FIGURE AND ITEM NUMBER OR REFERENCE SYMBOL

STOCK NO.	FIGURE NO.	ITEM NO. REF. SYMBOL	STOCK NO.	FIGURE NO.	ITEM NO. REF. SYMBOL
5805-760-6072	1-1	G001			
5820-477-3830	1-3	A3, A4			
5820-477-3835	1-3	A9, A10			
5820-477-3836	1-3	A5, A6			
5820-477-3837	1-3	A7, A8			
5820-477-3839	1-3	A1, A2			
5820-477-3841	1-3	A14			
5820-477-3842	1-3	A13			
5920-295-7013	1-1	F1 thru F4			
5930-411-7609	1-3	S1			
5935-436-8851	1-4	XY1, XY2			
5955-483-0486	1-3	Y1, Y2			
6130-401-1540	1-3	PS1, PS2			
6210-064-2998	1-1	DS23, DS24			
6210-226-4542	1-1	DS1 thru DS4			
6240-456-6099	1-1	DS15 thru DS22			

## INDEX

	Paragraph	Page
Adjustments:		
Circuit card output level .....	7-8	7-3
Power supply .....	7-7	7-2
Basic issue items list .....	App B	B-1
Chart, troubleshooting:		
Direct support .....	7-4	7-2
Organizational .....	4-8	4-2
Circuit card assembly, output level adjustments .....	7-8	7-3
Components and dimensions .....	1-6	1-2
Controls, indicators .....	3-2	3-1
Depot overhaul standards .....	8-5	8-1
Description .....	1-7	1-2
Destruction methods .....	5-4	5-1
Disassembly, shipment, and limited storage .....	5-1	5-1
Frequency generation circuits .....	6-1	6-1
Initial checks .....	2-7	2-1
Installation .....	2-5	2-1
Methods of destruction .....	5-4	5-1
Monitoring and automatic changeover circuits .....	6-2	6-1
Painting and refinishing .....	4-10	4-4
Power supply:		
Adjustments .....	7-7	7-2
Removal .....	7-5	7-2
Replacement .....	7-6	7-2
Preventive maintenance:		
Operator's daily .....	4-5	4-1
Organizational monthly .....	4-6	4-2
Purpose and use .....	1-4	1-1
Removal, repair, and replacement:		
Direct support:		
Power supply removal .....	7-5	7-2
Power supply replacement .....	7-6	7-2
Organizational .....	4-9	4-3
Repackaging, shipment, and limited storage .....	5-1	5-1
Shipment and limited storage .....	5-1	5-1
Siting .....	5-1	5-1
Technical characteristics .....	1-5	1-2
Test equipment, tools, materials required for direct support .....	7-2	7-1
Tests:		
Changeover system .....	7-11	7-4
Frequency accuracy and stability .....	7-16	7-10
Input power variation .....	7-15	7-9
Longitudinal unbalance .....	7-14	7-8
Output circuit isolation .....	7-12	7-6
Output impedance .....	7-13	7-7
Output level and frequency .....	7-10	7-3
Troubleshooting chart:		
Direct support .....	7-4	7-2
Organizational .....	4-8	4-2

By Order of the Secretary of the Army:

Official:

KENNETH G. WICKHAM,  
Major General, United States Army,  
The Adjutant General.

W. C. WESTMORELAND,  
General, United States Army,  
Chief of Staff.

Distribution:

*Active Army:*

USASA (2)  
CNGB (1)  
ACSC-E (2)  
USAMB (10)  
USAMC (1)  
USACDCCEA (1)  
USACDCCEA (Ft Huachuca) (1)  
8th LOGCOMD (5)  
ARADCOM (2)  
ARADCOM Rgn (2)  
OS Maj Comd (3)  
USASTRATCOM (25)  
USASTRATCOM-PAC (2)  
USASTRATCOM-EUR (50)  
USASTRATCOM-SO (2)  
USAINTS (3)  
USASCS (300)  
USAESC (100)

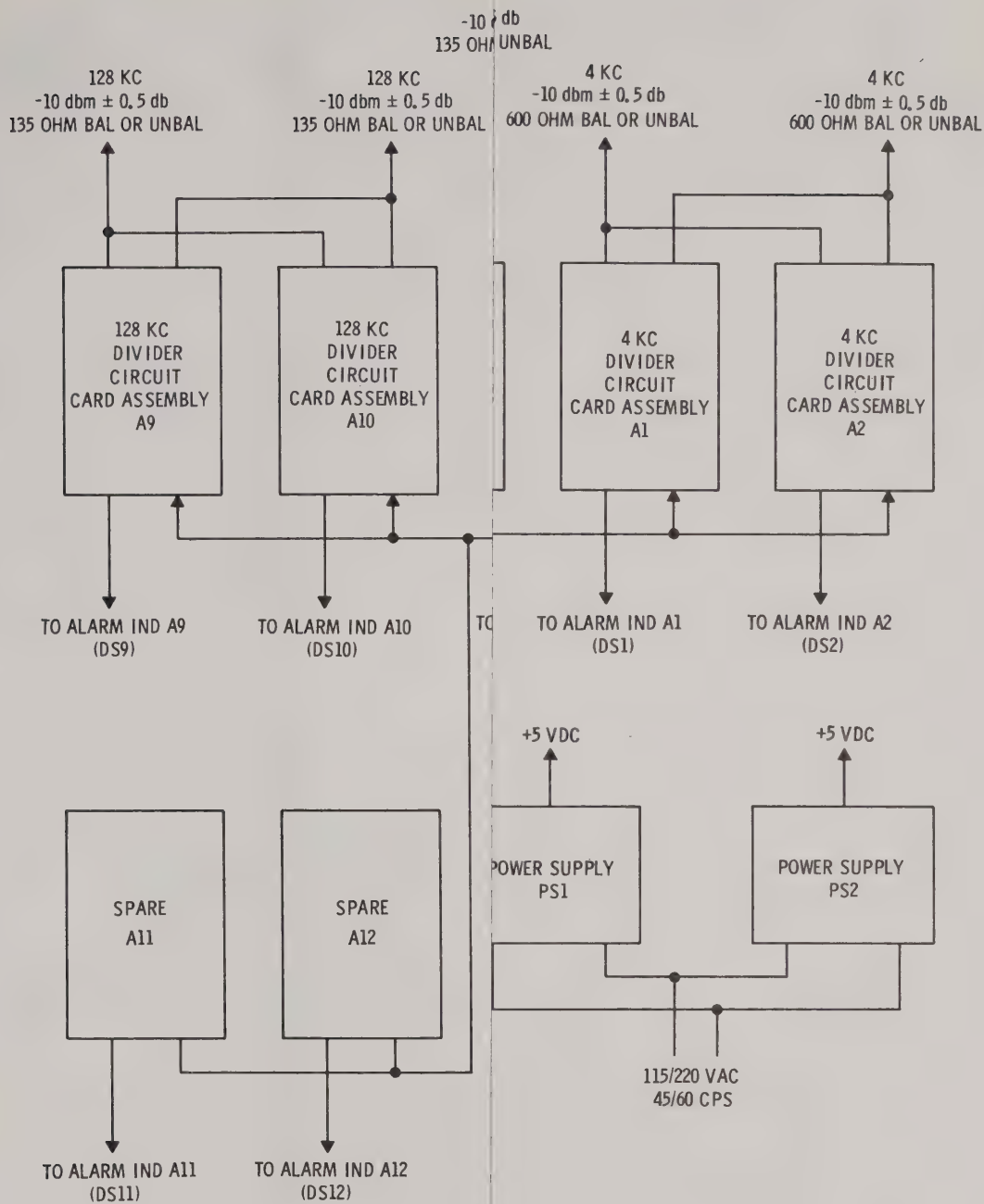
Army Dep (2) except  
SAAD (10)  
TOAD (10)  
LBAD (5)  
LEAD (5)  
Gen Dep (2)  
Sig Sec, Gen Dep (2)  
Sig Dep (2)  
MAAG (1)  
USARMIS (1)  
Units org under fol TOE (2 ea.):  
11-57  
11-97  
11-98  
11-117  
11-127  
11-158  
11-500(AA-AC)

ARNG: None.

USAR: None.

For explanation of abbreviations used, see AR 310-50.





By Order of the Secretary of the Army:

W. C. WESTMORELAND,  
*General, United States Army,  
Chief of Staff.*

Official:

KENNETH G. WICKHAM,  
*Major General, United States Army,  
The Adjutant General.*

Distribution:

*Active Army:*

USASA (2)  
CNGB (1)  
ACSC-E (2)  
USAMB (10)  
USAMC (1)  
USACDCCEA (1)  
USACDCCEA (Ft Huachuca) (1)  
8th LOGCOMD (5)  
ARADCOM (2)  
ARADCOM Rgn (2)  
OS Maj Comd (3)  
USASTRATCOM (25)  
USASTRATCOM-PAC (2)  
USASTRATCOM-EUR (50)  
USASTRATCOM-SO (2)  
USAINTS (3)  
USASCS (300)  
USAESC (100)

Army Dep (2) except  
SAAD (10)  
TOAD (10)  
LBAD (5)  
LEAD (5)  
Gen Dep (2)  
Sig Sec, Gen Dep (2)  
Sig Dep (2)  
MAAG (1)  
USARMIS (1)  
Units org under fol TOE (2 ea.):  
11-57  
11-97  
11-98  
11-117  
11-127  
11-158  
11-500(AA-AC)

ARNG: None.

USAR: None.

For explanation of abbreviations used, see AR 310-50.

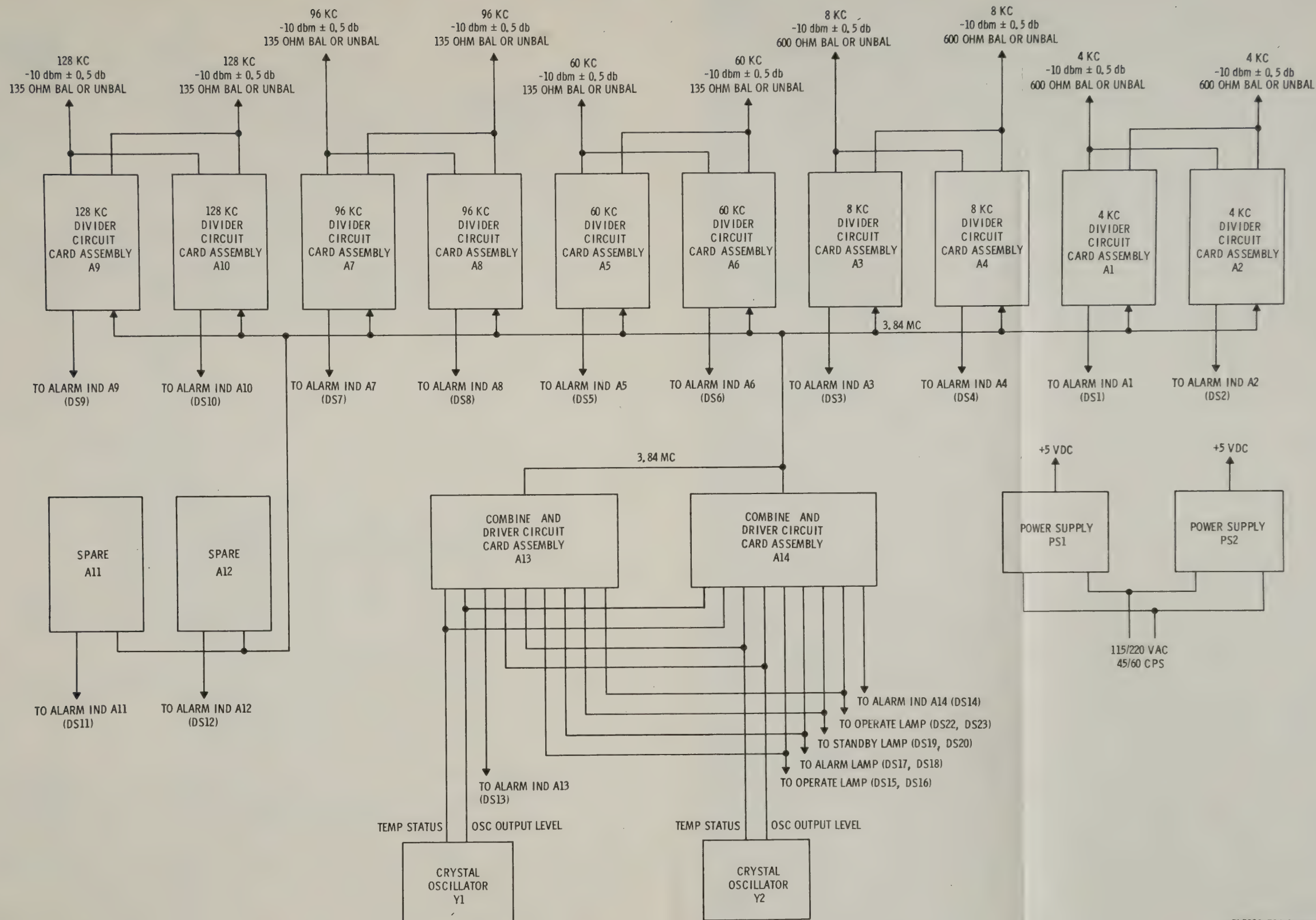
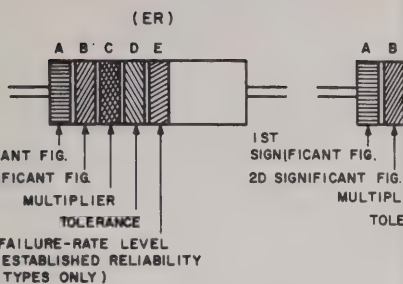


Figure 6-1. Oscillator-Coupler O-1562/FCC, block diagram.







COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS

COLOR CODE FOR COMPOSITION TYPE RESISTORS

BAND A		BAND B		BAND C
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR
BLACK.....	0	BLACK.....	0	BLACK.....
BROWN.....	1	BROWN.....	1	BROWN.....
RED.....	2	RED.....	2	RED.....
ORANGE.....	3	ORANGE.....	3	ORANGE.....
YELLOW.....	4	YELLOW.....	4	YELLOW.....
GREEN.....	5	GREEN.....	5	GREEN.....
BLUE.....	6	BLUE.....	6	BLUE.....
PURPLE.....	7	PURPLE.....	7	PURPLE.....
(VIOLET)		(VIOLET)		
GRAY.....	8	GRAY.....	8	SILVER.....
WHITE.....	9	WHITE.....	9	GOLD.....

BAND A — THE FIRST SIGNIFICANT FIGURE (BANDS A THRU D SHALL BE USED ON COMPOSITION TYPE RESISTORS)

BAND B — THE SECOND SIGNIFICANT FIGURE

BAND C — THE MULTIPLIER (THE MULTIPLIER BAND SHALL BE USED ON COMPOSITION TYPE RESISTORS)

BAND D — THE RESISTANCE TOLERANCE

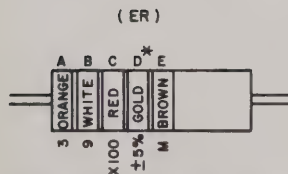
BAND E — WHEN USED ON COMPOSITION TYPE RESISTORS, THIS BAND SHALL BE USED TO IDENTIFY THE NOMINAL RESISTANCE VALUE OF OTHER BANDS, A THRU D

RESISTANCES IDENTIFIED BY BAND E (THESE ARE NOT DESIGNATORS. THE LETTER R IS USED TO IDENTIFY FRACTIONAL VALUES OF AN OHM ARE USED)

SOME RESISTORS ARE IDENTIFIED BY DESIGNATORS. THE LETTER R IS USED TO IDENTIFY FRACTIONAL VALUES OF AN OHM ARE USED

2R7 = 2.7 OHMS

FOR WIRE-WOUND-TYPE RESISTORS THE IDENTIFICATION MARKING IS SPECIFIED IN MIL-STD-883C



NOMINAL RESISTANCE 3,900 OHMS  
RESISTANCE TOLERANCE  $\pm 5\%$   
FAILURE RATE LEVEL M

NOMINAL RESISTANCE 3,900 OHMS  
RESISTANCE TOLERANCE  $\pm 5\%$   
FAILURE RATE LEVEL M

COMPOSITION-TYPE RESISTORS

\* IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS  $\pm 5\%$

A. COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS

USE WITH STYLES CM, CN, CY AND CB:

2D SIG FIG.	MULTIPLIER	CAPACITANCE TOLERANCE				CHARACTERISTIC			DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
		CM	CN	CY	CB	CM	CN	CB			
0	1			$\pm 20\%$	$\pm 20\%$		A			$-55^{\circ}\text{TO} +70^{\circ}\text{C}$	10-55 HZ
1	10					B	E	B			
2	100	$\pm 2\%$		$\pm 2\%$	$\pm 2\%$	C				$-55^{\circ}\text{TO} +85^{\circ}\text{C}$	
3	1,000		$\pm 30\%$			D		D	300		
4	10,000					E				$-55^{\circ}\text{TO} +125^{\circ}\text{C}$	10-2,000 HZ
5		$\pm 5\%$				F			500		
6										$-55^{\circ}\text{TO} +150^{\circ}\text{C}$	
7											
8											
9											
	0.1			$\pm 5\%$	$\pm 5\%$						
		$\pm 10\%$	$\pm 10\%$	$\pm 10\%$	$\pm 10\%$						

RESISTANCE COMPENSATING, STYLE CC.

2D SIG FIG.	MULTIPLIER	CAPACITANCE TOLERANCE		MIL ID
		CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
0	1		$\pm 2.0$ UUF	CC
1	10	$\pm 1\%$		
2	100	$\pm 2\%$	$\pm 0.25$ UUF	
3	1,000			
4				
5		$\pm 5\%$	$\pm 0.5$ UUF	
6				
7				
8	0.01			
9	0.1	$\pm 10\%$		
00			$\pm 1.0$ UUF	

EXAMPLE

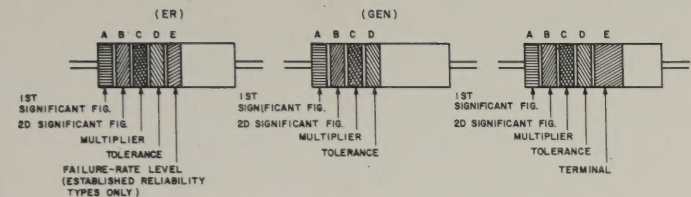
THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE VALUE

THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS: MIL-C-5, MIL-C-11272B, AND MIL-C-10950C RESPECTIVELY.

THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN

EFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE.





COLOR CODE MARKING FOR COMPOSITION TYPE RESISTORS.

COLOR-CODE MARKING FOR FILM-TYPE RESISTORS.

BAND A		BAND B		BAND C		BAND D		BAND E		
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL	TERM.
BLACK	0	BLACK	0	BLACK	1			BROWN	M	
BROWN	1	BROWN	1	BROWN	10			RED	P	
RED	2	RED	2	RED	100			ORANGE	R	
ORANGE	3	ORANGE	3	ORANGE	1,000			YELLOW	S	
YELLOW	4	YELLOW	4	YELLOW	10,000	SILVER	±10 (COMP. TYPE ONLY)	WHITE		SOLD-ERABLE
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5			
BLUE	6	BLUE	6	BLUE	1,000,000	RED	±2 (NOT APPLICABLE TO ESTABLISHED RELIABILITY)			
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7							
GRAY	8	GRAY	8	SILVER	1.01					
WHITE	9	WHITE	9	GOLD	0.1					

BAND A — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH.)

BAND B — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE.

BAND C — THE MULTIPLIER [THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE.]

BAND D — THE RESISTANCE TOLERANCE.

BAND E — WHEN USED ON COMPOSITION RESISTORS, BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL. ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1-1/2 TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL.

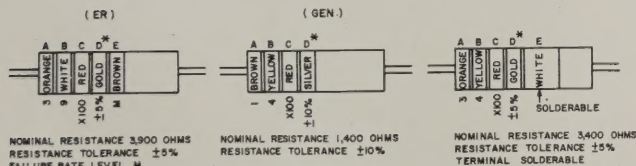
RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS (THESE ARE NOT COLOR CODED)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA NUMERIC DESIGNATORS. THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED. FOR EXAMPLE:

2R7 = 2.7 OHMS 10R0 = 10.0 OHMS

FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED, IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS.

EXAMPLES OF COLOR CODING

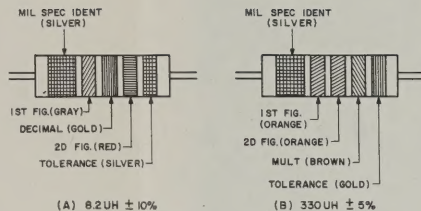


COMPOSITION-TYPE RESISTORS

FILM-TYPE RESISTORS

\* IF BAND D IS OMITTED, THE RESISTOR TOLERANCE IS ±20% AND THE RESISTOR IS NOT MIL-STD.

A. COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS.



COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES. AT A, AN EXAMPLE OF OF THE CODING FOR AN 8.2UH CHOKE IS GIVEN. AT B, THE COLOR BANDS FOR A 330UH INDUCTOR ARE ILLUSTRATED.

TABLE 2  
COLOR CODING FOR TUBULAR ENCAPSULATED R.F. CHOKES.

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE	6		
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD			5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL.

B. COLOR CODE MARKING FOR MILITARY STANDARD INDUCTORS.

CAPACITORS, FIXED, VARIOUS-DIELECTRICS, STYLES CM, CN, CY, AND CB.

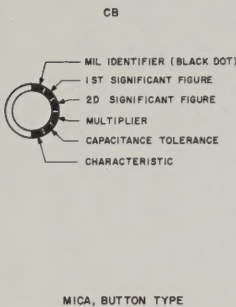
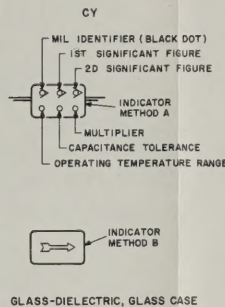
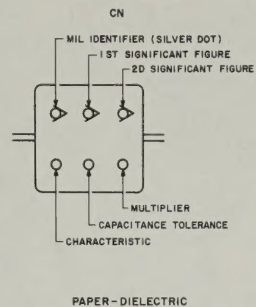
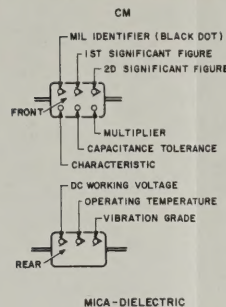


TABLE 3 — FOR USE WITH STYLES CM, CN, CY AND CB.

COLOR	MIL ID	1ST SIG FIG.	2D SIG FIG.	MULTIPLIER	CAPACITANCE TOLERANCE				CHARACTERISTIC	DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
					CM	CN	CY	CB				
BLACK	CM, CY, CB	0	0	1			±20%	±20%	A		-55° TO +70°C	10-56 Hz
BROWN		1	1	10					B	E		
RED		2	2	100	±2%		±2%	±2%	C		-55° TO +85°C	
ORANGE		3	3	1,000		±30%			D	D	300	
YELLOW		4	4	10,000					E		-55° TO +125°C	10-2,000 Hz
GREEN		5	5		±5%				F		300	
BLUE		6	6								-55° TO +150°C	
PURPLE (VIOLET)		7	7									
GRAY		8	8									
WHITE		9	9									
GOLD				0.1			±5%	±5%				
SILVER	CN				±10%	±10%	±10%	±10%				

TABLE 4 — TEMPERATURE COMPENSATING, STYLE CC.

COLOR	TEMPERATURE COEFFICIENT	1ST SIG FIG.	2D SIG FIG.	MULTIPLIER	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0	1		±2.0 UUF	CC
BROWN	-30	1	1	10	±1%		
RED	-80	2	2	100	±2%	±0.25 UUF	
ORANGE	-150	3	3	1,000			
YELLOW	-220	4	4				
GREEN	-330	5	5		±3%	±0.5 UUF	
BLUE	-470	6	6				
PURPLE (VIOLET)	-750	7	7				
GRAY		8	8	0.01			
WHITE		9	9	0.1	±10%		
GOLD	+100					±1.0 UUF	
SILVER							

- THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE IN UUF.
- LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS: MIL-C-5, MIL-C-250, MIL-C-112728, AND MIL-C-10950C RESPECTIVELY.
- LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE-TEMPERATURE LIMITS DESIGNATED IN MIL-C-11015D.
- TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE.

C. COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS.

Figure 8-1. Color code marking for MIL-STD resistors, capacitors and inductors.



TABLE 1		TABLE 2		TABLE 3		TABLE 4		TABLE 5	
Year	Value	Year	Value	Year	Value	Year	Value	Year	Value
1950	100	1951	105	1952	110	1953	115	1954	120
1955	125	1956	130	1957	135	1958	140	1959	145
1960	150	1961	155	1962	160	1963	165	1964	170
1965	175	1966	180	1967	185	1968	190	1969	195
1970	200	1971	205	1972	210	1973	215	1974	220
1975	225	1976	230	1977	235	1978	240	1979	245
1980	250	1981	255	1982	260	1983	265	1984	270
1985	275	1986	280	1987	285	1988	290	1989	295
1990	300	1991	305	1992	310	1993	315	1994	320
1995	325	1996	330	1997	335	1998	340	1999	345
2000	350	2001	355	2002	360	2003	365	2004	370
2005	375	2006	380	2007	385	2008	390	2009	395
2010	400	2011	405	2012	410	2013	415	2014	420
2015	425	2016	430	2017	435	2018	440	2019	445
2020	450	2021	455	2022	460	2023	465	2024	470

